

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

April 2, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-35

SPACE MICROGRAVITY AND LIFE SCIENCES ON NASA TV MONDAY

On Monday NASA TV will feature interviews and highlights from the Space Life Sciences and Microgravity Research Conference in Houston, TX. Footage of the Digital Retinal Funduscope, a telemedicine device that could allow a video image of the human retina to be obtained and transmitted from remote locations for medical evaluation will be shown. Also aired will be a review of how the Dried Blood Chemistry method, developed at NASA's Johnson Space Center, Houston, TX, may be used to screen for diseases in remote areas where hardware such as a centrifuge may not be available to physicians. NASA's Life Sciences Archive, based on more than 30 years of space flight, will be reviewed. The archive is currently scheduled to become available over the Internet and the World Wide Web in late 1995. Interviews with scientists and astronauts discussing the importance of life sciences and microgravity research in space will conclude Monday's video news file.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EST)

ITEM #1: <i>Funduscope telemedicine machine</i>	TRT: 3:00
ITEM #2: <i>Dried chemistry method</i>	TRT: 3:00
ITEM #3: <i>New life sciences data archive</i>	TRT: 3:00
ITEM #4: <i>Heart pump research with Michael DeBakey, MD</i>	TRT: 2:52
ITEM #5: <i>Life science video with astronaut/physician Rhea Seddon</i>	TRT: 3:00
ITEM #6: <i>Interview with Rhea Seddon on life sciences research</i>	TRT: 3:00
ITEM #7: <i>Space footage of astronaut/physician Bernard Harris</i>	TRT: 3:00
ITEM #8: <i>Interview with Bernard Harris</i>	TRT: 3:00

All TRT's are approximate and subject to change.

Public Affairs Contacts

Microgravity and life sciences

Eileen Hawley, 713/483-5111

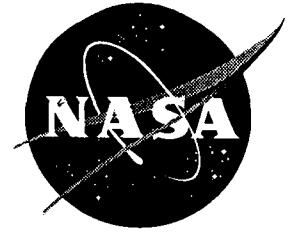
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News Release

National Aeronautics and
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For Release

April 3, 1995

Jim Sahli
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RELEASE: 95-42

JOSEPH H. ROTHENBERG NAMED DEPUTY DIRECTOR OF GODDARD

Joseph H. Rothenberg has been selected the new deputy director of NASA's Goddard Space Flight Center, Greenbelt, MD. His appointment, announced today by NASA Administrator Daniel Goldin, is effective April 24.

Rothenberg is currently serving as executive vice president of Computer Technology Associates, Inc., Space Systems Division, Lanham, MD, a position he has held since leaving Goddard in February 1994.

From 1990 to 1994, he was associate director of flight projects for the Hubble Space Telescope (HST) at Goddard. In this position, he directed the development and execution of the successful first servicing mission of the HST.

In making the announcement, Goldin said, "Joe Rothenberg is one of the people who deserves much of the credit for the repair and continuing outstanding success of Hubble. In that endeavor and others, Joe has proven himself again and again as an able and effective manager, and I'm especially proud to welcome him back to the NASA family."

Goddard Center Director Dr. John M. Klineberg stated, "Joe's appointment as deputy director is very good news for the Center. He is a wonderful engineer and manager. We are very pleased to have Joe back with us."

The new deputy director began his career with Grumman Aerospace in 1964, where he managed the development and operations of the aerospace ground equipment for the Orbiting Astronomical Observatory series of Goddard spacecraft. While at Grumman he served as staff project engineer to the director of engineering for test and operations and as project manager for Goddard's Solar Maximum Mission.

-more-

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From 1981 until 1983, Rothenberg was with Computer Technology Associates, where he managed all of the ground system test and operations systems engineering projects. These projects included the HST, Solar Maximum Repair Mission and Space Tracking and Data System Architecture projects.

In 1983, Rothenberg joined Goddard as operations manager for the HST. As operations manager, Rothenberg led the NASA team responsible for developing and conducting orbital operations of the HST.

In April 1987, he was appointed chief of the Mission Operations Division under the Mission Operations and Data Systems Directorate at Goddard. In September 1989 he was appointed deputy director of Mission Operations and Data Systems at Goddard, followed by his appointment in 1990 as associate director for flight projects for the HST.

Rothenberg holds a bachelor of science degree in engineering science and a master of science degree in engineering management from C.W. Post College of the Long Island University. He is a member of the American Institute of Aeronautics and Astronautics (AIAA) and past president of the Long Island Section of the Instrument Society of America. He was the recipient of the AIAA's Goddard Astronautics Award and the National Space Club Goddard Memorial Award in 1994.

-end-

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News Release

National Aeronautics and
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Washington, DC 20546
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For Release

David Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

April 4, 1995

Rob Navias
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(Phone: 713/483-5111)

NOTE TO EDITORS: N95-18

WEEKLY REPORTS ON MIR MISSION TO AIR ON NASA TV

NASA's "Mission Update" program will provide weekly reports beginning April 7 on the flight of U.S. astronaut Norm Thagard aboard the Russian Mir space station.

"Mission Update" will provide a comprehensive recap of the week's events on orbit involving Thagard and his crewmates, Commander Vladimir Dezhurov and Flight Engineer Gennadiy Strekalov, as well as a preview of the next week's activities of the Mir 18 mission.

The Mir 18 editions of "Mission Update" will air each Friday at 11:30 a.m. EDT, just prior to the Video News File program, which originates from NASA Headquarters. "Mission Update" will continue each week throughout the duration of the scheduled three-month stay by Thagard and his colleagues aboard Mir.

NASA Television is carried on GTE Spacenet 2, Transponder 5, Channel 9 at 69 degrees West longitude, frequency 3880.0 Megahertz, audio 6.8 Megahertz.

-end-

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For Release

April 4, 1995

VIDEO ADVISORY: V95-37

NEW HUBBLE VIEW OF DISTANT GALAXY CLUSTER ON NTV APRIL 5

On Wednesday NASA TV will air a view taken by the Hubble Space Telescope of the distant galaxy cluster Abell 2218, illustrating a phenomenon known as gravitational lensing. The arc-like shapes distributed over the picture are an illusion caused by a gravitational field so massive and compact that light rays passing through it are deflected by its enormous gravitational field, much as an optical lens bends light to form an image. Following the new Hubble images and an interview with astronomer Perry Greenfield discussing the importance of gravitational lenses, NASA TV will show a recent image from Hubble of storms on Jupiter, and animation and footage of the telescope. Videos and an interview addressing how clouds can help predict climate change will close out Wednesday's video news feed.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Hubble views gravitational lens</i>	TRT: :33
ITEM #2: <i>Interview with astronomer Perry Greenfield</i>	TRT: 2:32
ITEM #3: <i>Hubble tracks storms on Jupiter</i>	TRT: :30
ITEM #4: <i>Hubble Space Telescope -- animation</i>	TRT: 3:01
ITEM #5: <i>Clouds predict climate change</i>	TRT: 1:33
ITEM #6: <i>Aircraft used for clouds study</i>	TRT: 4:26
ITEM #7: <i>Interview with Peter Pilewskie on cloud study</i>	TRT: 2:27

All TRT's are approximate and subject to change.

Public Affairs Contacts

Hubble Space Telescope
Clouds research

Don Savage, 202/358-1547
Brian Dunbar, 202/358-1547

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News Release



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For Release

Brian Dunbar
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April 4, 1995

David Morse
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(Phone: 415/604-4724)

RELEASE: 95-43

NASA STUDY HELPS ANSWER KEY CLIMATE QUESTION

Evidence that clouds absorb more solar radiation than previously believed should improve researchers' ability to predict climate change, according to NASA scientists.

The work resulted from simultaneous flights of NASA's ER-2 and DC-8 aircraft above and below cloud decks. By using identical instruments on the aircraft, scientists were able to measure solar radiation as it reached the clouds and after the clouds had scattered it.

The team found conclusive evidence that existing computer models significantly underestimate the amount of solar energy absorbed by clouds. Theoretical estimates of cloud solar absorption are substantially smaller than what actual measurements show. "This finding directly impacts our understanding of present climate and, therefore, our ability to predict future climate," said atmospheric physicist Peter Pilewskie of NASA's Ames Research Center, Mountain View, CA.

"Existing global climate models are unreliable when it comes to predictive capability," said Pilewskie. "One of the primary reasons is that the amount of solar energy absorbed and scattered by clouds, a key determining variable in such models, is very poorly understood."

For almost 40 years, atmospheric physicists have tried to estimate solar absorption by clouds. Several studies have suggested that clouds absorb more radiation than prevailing models have indicated.

"Now, for the first time, NASA's research aircraft have provided consistent evidence that clearly supports this contention," Pilewskie concluded.

- more -

The cloud-absorption study embodies the ultimate goal of NASA's Mission to Planet Earth: to increase our knowledge of how large-scale phenomena such as cloud cover and solar energy influence the Earth's global environment. One of the least understood areas of climate change is the role clouds play. This study represents one piece of a very large puzzle that Mission to Planet Earth will address over the next 20 years.

Previous attempts at direct measurement of solar absorption have been hampered by an inadequate number of aircraft or a lack of identical instruments to make consistent measurements. In this study, a NASA ER-2 flew at approximately 12 miles altitude. Simultaneously, a NASA DC-8 aircraft or a Learjet flew at altitudes between approximately five to seven miles. Each aircraft carried identical instruments for simultaneous measurement of solar radiation at both flight levels.

Estimates developed by Pilewskie and Francisco Valero of the Scripps Institution of Oceanography, San Diego, CA, using the improved data sets showed a considerable variance with the predictions of theoretical models. Their findings were consistent with other recent studies and, for the first time, demonstrated that measured cloud absorption consistently exceeds theoretical estimates.

The reason for this high absorption is unclear, and scientists say further study is required. While several factors are being considered, there are hints that it may be due to the structure and dimensions of clouds. The study was funded by NASA's Office of Mission to Planet Earth.

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NewsRelease

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Don Savage
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For Release

April 5, 1995

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Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

NOTE TO EDITORS: N95-19

HUBBLE IMAGES DISTANT GALAXIES THROUGH COSMIC "ZOOM LENS"

A new image taken with NASA's Hubble Space Telescope of the galaxy cluster Abell 2218 -- a spectacular example of gravitational lensing -- is available via the Internet and NASA's Imaging Branch.

The cluster is so massive and compact that light rays passing through it are deflected by its enormous gravitational field, much as an optical lens bends light to form an image. The process provides a powerful "zoom lens" for viewing galaxies that are so far away they could not normally be observed with the largest available telescopes.

The arc-like images distributed over the field of view like a spider web are an illusory effect caused by the gravitational field of the cluster which magnifies, brightens and distorts images of objects that lie far beyond the cluster.

The arcs represent the distorted images of a very distant galaxy population extending 5-10 times farther from Earth than the lensing cluster. This population existed when the universe was just one quarter of its present age, and contains valuable clues as to the early evolution of galaxies. The image was taken with the Wide Field Planetary Camera 2.

Imaging Branch Photo number: B&W: 95-H-141

Internet Addresses: ftp: ftp.stsci.edu (IP address: 130.167.1.2)
WWW URL: http://www.stsci.edu
Gopher: www.stsci.edu

Via anonymous ftp: ftp.stsci.edu in /pubinfo:
(format) GIF
/pubinfo/gif/A2218.gif
- end -

JPEG
/pubinfo/jpeg/A2218.jpg

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For Release

April 5, 1995

VIDEO ADVISORY: V95-38

COMPLETED SPACE STATION MODULE DEBUTS ON NTV THURSDAY

Thursday's NASA TV video news file will feature the first footage of a recently completed major component of the International Space Station. The completion of the node module marks a major milestone in NASA's building of the Space Station, scheduled to begin construction in Earth orbit in 1997. The module will help link the various segments of the Space Station where astronauts and cosmonauts will live and work. The completed module is now ready for structural testing. Following footage of the Space Station module, video from the Kennedy Space Center, FL, will show functional tests being performed on the Orbital Docking System, a crucial linking "bridge" which will be used to join the Space Shuttle Atlantis and the Russian Mir space station during their docking this summer. NASA TV will close out the day's video news file with a replay of recently released Hubble Space Telescope images.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Space Station module completed</i>	TRT: 3:50
ITEM #2: <i>Functional tests on docking systems</i>	TRT: 3:36
ITEM #3: <i>Hubble views gravitational lens</i>	TRT: :33
ITEM #4: <i>Interview with astronomer Perry Greenfield</i>	TRT: 2:32
ITEM #5: <i>Hubble tracks storms on Jupiter</i>	TRT: :30
ITEM #6: <i>Hubble Space Telescope -- animation</i>	TRT: 3:01

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Public Affairs Contacts

International Space Station
Hubble Space Telescope

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For Release

April 6, 1995

VIDEO ADVISORY: V95-39

LIVE INTERVIEW WITH AMERICAN ASTRONAUT FROM MIR FRIDAY

On Friday at 12:48 p.m. EDT NASA TV will air a 10 minute feed that includes a status report from American astronaut Norm Thagard aboard Russia's Mir space station and an interview between Thagard and WPIV-TV, Philadelphia. Replay of the WPIV-TV interview at 3, 6, and 9 p.m. EDT will include both sides of the conversation. Thagard is the first American to be a crew member aboard the Russian space station.

Friday's video news file also will show replays from Thursday of the unveiling of a recently completed major component of the International Space Station. The completion of the node module marks a major milestone in NASA's building of the Space Station, scheduled to begin construction in Earth orbit in 1997. The module will help link the various segments of the Space Station where astronauts and cosmonauts will live and work. The completed module is now ready for structural testing. Following footage of the Space Station module, video from the Kennedy Space Center, FL, will show functional tests being performed on the Orbital Docking System, a crucial linking "bridge" which will be used to join the Space Shuttle Atlantis and the Russian Mir space station during their docking this summer. NASA TV will close out the day's video news file with a replay of recently released Hubble Space Telescope images.

NOTE: the first live feed from Mir on Friday at 12:48 p.m. EDT will be one-way video and audio of Thagard's status report and WPIV-TV interview.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay of Interview with astronaut Norm Thagard from Mir</i>	TRT: 15:00
ITEM #2: <i>Space Station module completed</i>	TRT: 4:30
ITEM #3: <i>Functional tests on docking systems</i>	TRT: 3:36
ITEM #4: <i>Hubble views gravitational lens</i>	TRT: :33
ITEM #5: <i>Interview with astronomer Perry Greenfield</i>	TRT: 2:32
ITEM #6: <i>Hubble tracks storms on Jupiter</i>	TRT: :30
ITEM #7: <i>Hubble Space Telescope -- animation</i>	TRT: 3:01

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Public Affairs Contacts

Norm Thagard, astronaut program
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News Release



National Aeronautics and
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For Release

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April 6, 1995

Jim Sahli
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RELEASE: 95-44

NASA SELECTS EER FOR ORBITAL, RECOVERY EXPERIMENTS

NASA has signed a contract with EER Systems Corp. of Vienna, VA, to provide on-orbit data and experiment recovery services during a mission this summer, using enhanced components from a previous program concept known as "COMET." The contract is written on a firm fixed-price basis for a total of \$14 million and for a period lasting approximately one year.

The primary objective of this mission is to support NASA's ongoing space activities by providing increased access to space for microgravity experiments originally envisioned for the COMET program. NASA hopes this effort will demonstrate an unmanned commercial space system capable of flying and recovering small research and commercial payloads which require longer exposure to the microgravity environment than is possible aboard the Space Shuttle.

EER will be performing this work both at its facilities at Seabrook, MD, and at the Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, VA.

Launch from Wallops is expected to take place in late July 1995 aboard a Conestoga launch vehicle. The microgravity experiments -- half sponsored by NASA and half sponsored by private industry -- will be housed in two payload modules: a service module, which is expected to transmit science information from low-Earth orbit for about a year; and a recovery module, which is expected to remain in orbit for approximately a month, then return to a water landing near the Virginia launch site. The experiment complement cuts across a variety of research disciplines and will include navigational aids, communications packages, ultraviolet and remote sensing instruments, materials exposure to space experiments, new spacecraft technology demonstrations and plant and crystal growth.

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The contract is managed by Goddard Space Flight Center for the Office of Space Access and Technology at NASA Headquarters, Washington, DC.

- end -

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For Release

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Headquarters, Washington, DC
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April 6, 1995

Kari Fluegel
Johnson Space Center, Houston
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Jim Keller
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RELEASE: 95-45

EXTERIOR OF SPACE STATION MODULE COMPLETED; FIRST IDR HELD

The exterior structure of the first United States pressurized module for the international Space Station has been completed, resulting in a major program milestone.

The module, called a node, is where the Space Shuttle will dock and serve as the connecting passageway for the Space Station's other modules where astronauts and cosmonauts will live and work.

Another major program milestone completed recently was the first Incremental Design Review (IDR). Held at the Johnson Space Center, the IDR assures that the Space Station meets its specifications for successful flight, on-orbit assembly, operations, and science and technology research and development. The IDR concentrated on hardware being launched on the first six U.S. Shuttle flights as well as the first five Russian launches.

The successful review by NASA, its international partners and contractors "reassures us we will continue to meet our schedule and cost targets," said Space Station Director Wilbur Trafton. "We have set very ambitious goals and deadlines which we continue to meet."

Each aluminum module weighs about 5,000 pounds, is 18 feet long and 14 feet in diameter. A node consists of two bulkheads, or endcones; two cylinder sections; six docking ports; and three large ring frames.

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The just completed structure is one of two connecting nodes being built for the Space Station. This first node will be used as a structural test article for various pressure and leak tests. It will then be refurbished and become Node 2 -- the second node to be launched to the international Space Station. Node 2 is scheduled to fly in September 1999.

Node 1, the first node to be launched, is now being built in NASA's Space Station manufacturing building located at the Marshall Space Flight Center, Huntsville, AL. Node 1 will be built using the data verified from tests with the structural test article. Node 1's exterior structure will be completed in late June and is scheduled to fly in December 1997.

Both nodes are being built by Boeing Defense and Space Group, Huntsville. Boeing, prime contractor for the Space Station, will build the U.S. laboratory module where the astronauts will work and the habitat modules where they will eat and sleep. Construction of both the laboratory and habitation modules is now underway in the Space Station manufacturing building.

Boeing also is building composite racks that hold experiments and operating systems inside the Space Station modules. Boeing will build 150 racks at a rate of five a month.

To date, Boeing has built over 26,000 pounds of hardware. By September 1995, Boeing will have built 40,800 pounds of hardware including the completion of 12 rack structures, seven hatches and welding of the laboratory module. By the end of this year, the laboratory module exterior structure also will be completed.

Note to Editors: Images are available to news media representatives by calling the Broadcast and Imaging Branch at 202/358-1900. Photo numbers are:

B&W	95-H-146
Color	95-HC-142

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For Release

April 7, 1995

Dwayne Brown
Headquarters, Washington, DC
(Phone: 202/358-1600)

Jim Sahli
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-0697)

RELEASE: C95-f

JOHNSON CONTROLS ASSURANCE COMPANY SELECTED TO NEGOTIATE

NASA's Goddard Space Flight Center, Greenbelt, MD, has selected the Johnson Controls Assurance Co., Cape Canaveral, FL, to negotiate a \$94 million cost-plus-award-fee contract to provide quality assurance and engineering support services to the Office of Flight Assurance at Goddard.

The contract will include quality assurance for flight hardware, software, and mission integration to augment and supplement the Office of Flight Assurance in implementing Goddard's flight assurance program.

The total contract period of performance will be from July 1, 1995, through June 30, 2000.

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For Release

April 7, 1995

NOTE TO EDITORS: N95-21

IN-FLIGHT PRESS CONFERENCE FROM MIR SCHEDULED FOR APRIL 12

NASA astronaut Norman Thagard and Russian cosmonauts Vladimir Dezhurov and Gennadiy Strekalov will conduct an in-flight press conference at 9:12 a.m. EDT on Wednesday, April 12, aboard the Russian Mir space station.

The press conference is scheduled to last approximately 20 minutes. NASA's Johnson Space Center, Houston, and the Kennedy Space Center, FL, will be the sites for media representatives to participate.

This event will be carried live on NASA Television, broadcast on Spacenet-2, transponder 5, channel 9, at 69 degrees West longitude, frequency 3880.0 Mhz, audio 6.8 Megahertz.

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For Release
April 9, 1995

VIDEO ADVISORY: V95-40

SUPERNOVA REMNANT, APOLLO 13 ANNIVERSARY ON NTV MONDAY

On Monday NASA TV will air an image taken by the Hubble Space Telescope showing oxygen-rich supernova debris in a nearby galaxy. The tattered debris of a star that exploded 3,000 years ago, known as supernova remnant N132D, lies about 160,000 light-years away in the Large Magellanic Cloud, a satellite galaxy to Earth's Milky Way Galaxy. The image will help scientists test theories of stellar evolution. Following the new Hubble image, NASA TV will air footage celebrating the 25th anniversary of the Apollo 13 mission, the third manned lunar landing attempt which was aborted after over 142 hours of flight due to a spacecraft malfunction. Closing out Monday's feed will be a replay of footage that review events that have lead to the current joint Russian-U.S. space activities aboard the Mir space station with American astronaut Norm Thagard.

NOTE: The next live television from the Mir space station will be on NASA TV Tuesday at approximately 5 p.m. EDT when the Russian Progress 227 resupply vehicle will dock with the Mir. On Wednesday, April 12, there will be a 20 minute live press conference from Mir starting at 9:12 a.m. EDT.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Hubble views supernova remnant</i>	TRT: :30
ITEM #2: <i>Apollo 13 25th Anniversary footage</i>	TRT: 10:00
ITEM #3: <i>Replay -- tour of the Mir space station with American Norm Thagard</i>	TRT: 8:47
ITEM #4: <i>Replay -- Mir 18 crew launch preparation</i>	TRT: 11:16
ITEM #5: <i>Replay -- American astronaut launches on a Russian Soyuz</i>	TRT: 5:42
ITEM #6: <i>Replay -- Mir 18 crew docking with Russian space station</i>	TRT: 4:01

All TRT's are approximate and subject to change.

Public Affairs Contacts

Hubble Space Telescope
Apollo 13, Norm Thagard
International Space Station

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David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

April 11, 1995

VIDEO ADVISORY: V95-42

MIR PRESS CONFERENCE, COLUMBIA ANNIVERSARY ON NASA TV

A live press conference from the Mir space station and the return of Columbia to the Space Shuttle fleet highlight NASA Television coverage on Wednesday.

The press conference from Mir will feature U.S. astronaut Norm Thagard, who is approaching the end of his first month aboard the Russian space station. The press conference, with questions originating from media at the Johnson Space Center, Houston, and the Kennedy Space Center, FL, will air from 9:12 to 9:32 a.m. EDT.

Also Wednesday, NASA TV's regular video news file will feature the return of the Space Shuttle Columbia after six months of routine modifications in California. Columbia, the oldest Space Shuttle Orbiter, will return to the Kennedy Space Center, weather permitting. The date marks the fourteenth anniversary of Columbia's maiden voyage, the first flight of the Shuttle program, on April 12, 1981. During 17 missions to date, Columbia has accumulated more than 62 million miles in space and over 2,300 orbits of the Earth.

Also on Wednesday's video file, NTV will feature a replay of the docking of the Progress 227 vehicle with the Mir space station from Tuesday, coverage of protein crystal growth research, and footage marking the 25th anniversary of the voyage of Apollo 13.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Columbia Modifications Complete</i>	TRT	4:00
ITEM #2: <i>Columbia's first mission STS-1</i>	TRT	4:00
ITEM #3: <i>Resupply capsule docks with Mir</i>	TRT:	5:00
ITEM #4: <i>Microgravity Research</i>	TRT	3:31
ITEM #5: <i>Interview with Dr. Marc Pusey on protein crystal growth</i>	TRT:	2:00
ITEM #6: <i>Interview with Bill Witherow on research techniques</i>	TRT	2:00
ITEM #7: <i>Apollo 13 25th Anniversary footage</i>	TRT:	13:21

All TRT's are approximate and subject to change.

Public Affairs Contacts

Progress 227/Mir docking
Microgravity Research Program

Rob Navias, 713/483-5111
Mike Braukus, 202/358-1779

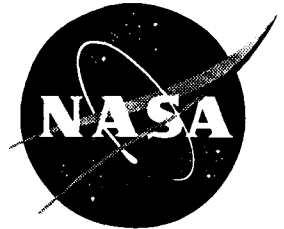
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Sarah Keegan
Headquarters, Washington, DC
(Phone: 202/358-1902)

For Release
April 11, 1995

RELEASE: 95-47

NASA PRESENTS LOW AWARD TO UNISYS SPACE SYSTEMS

NASA Administrator Daniel S. Goldin today presented the 1994 George M. Low Award to the Unisys Corp., Space Systems Unit, Houston, at the Tenth NASA Continual Improvement and Reinvention Conference in Alexandria, VA.

In announcing the selection for NASA's quality and excellence award, Goldin recognized Unisys Space Systems "for its excellent total quality program and as a superior developer and provider of top-notch software, critical to the Nation's aeronautics and space program."

Unisys Space Systems supplies software products, services and support to NASA's Johnson Space Center in Houston for major programs including Space Shuttle and space station operations and mission control center upgrades. The 1994 Low honoree also provides software and services for management information systems and flight simulations at NASA's Langley Research Center, Hampton, VA, and performs quality engineering and assurance for NASA's Goddard Space Flight Center, Greenbelt, MD.

"This organization has demonstrated outstanding performance in attaining a level of quality management that elicits our esteem and appreciation," said Fred Gregory, NASA Associate Administrator for Safety and Mission Assurance, who chaired the 1994 Low Award panel of judges.

The George M. Low Award is presented to current NASA suppliers who demonstrate sustained excellence and outstanding achievements in quality management. In 1993, to further support the national effort to achieve quality excellence throughout industry, the Low Award was linked with the Malcolm Baldrige National Quality Award. Applicants for the Low Award must first reach the consensus stage of the Baldrige Award. This is the first Low Award given under the realigned process.

-more-

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Past recipients of this prestigious award include: Honeywell Inc., Space and Strategic Systems Operation, and IBM Federal Systems Company, Houston (1992); Thiokol Corporation, Space Operations, and Grumman Corporation, Technical Services Division (1991); Rockwell International, Space Systems Division, and Marotta Scientific Controls, Inc. (1990); Lockheed Engineering and Sciences Company (1989); Rockwell International Corporation, Rocketdyne Division (1988); and IBM Federal Sector Division and Martin Marietta Manned Space Systems (1987).

Information on the 1995 award program can be obtained by contacting the George M. Low Award Program, NASA Headquarters, Code T, Washington, DC 20546-0001 (Telephone: 202/358-2157).

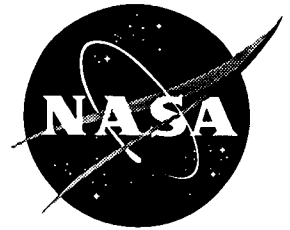
-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

Internet Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
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David DeFelice
Lewis Research Center, Cleveland, OH
(Phone: 216/433-6186)

For Release

April 12, 1995

INTERNET ADVISORY: I95-5

NASA LEWIS RESEARCH CENTER HOME PAGE AVAILABLE ON INTERNET

The NASA Lewis Research Center's World Wide Web home page has a new look and features a Public Affairs home page. People from all over the world can access and learn about the Lewis Research Center, one of NASA's principle aeronautical research facilities, through a series of multimedia "pages" which describe NASA Lewis, its programs, people, and history. Features of the Public Affairs home page include a welcome from Center Director Donald J. Campbell, video clips from unmanned launches, and a facilities page with an animated fly-in and interactive map of the Center.

The NASA Lewis World Wide Web home page is available at URL:

<http://www.lerc.nasa.gov/>

The NASA Lewis Public Affairs home page is accessible from the Lewis home page or directly at URL:

http://www.lerc.nasa.gov/Other_Groups/PAO/

An anonymous File Transfer Protocol (FTP) server is also available. It includes press releases since 1993. They can be accessed at [FTP.LERC.NASA.GOV](ftp://FTP.LERC.NASA.GOV) in the /pao/pressrel/ directory.

Lewis is NASA's Center of Excellence in aircraft propulsion, microgravity science, and aerospace technology including space power, communications and electric propulsion. Lewis also is responsible for NASA's intermediate and large expendable launch vehicle programs. Other major programs include the Advanced Communications Technology Satellite (ACTS) and High Speed Research programs aimed at developing a new supersonic civil transport. Online information is available on each of these programs.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

For Release
April 12, 1995

RELEASE: 95-48

NASA AWARDS EDUCATION GRANTS TO MINORITY UNIVERSITIES

NASA Administrator Daniel S. Goldin announced the selection of eight universities to receive three-year Precollege Awards for Excellence in Mathematics, Science, Engineering, and Technology (PACE/MSET) grants for educational outreach projects.

Each university will receive up to \$300,000 over the three years of the grant based on performance and availability of funds under the Precollege (PACE/MSET) program.

The grants are intended to help students who have historically been underrepresented in college-preparatory mathematics and science classes and who graduate from high school with the skills and interests necessary to pursue science, engineering and related fields in college.

The universities selected to receive grants are:

- Lincoln University, Philadelphia, PA
- Bennett College, Greensboro, NC
- Stillman College, Tuscaloosa, AL
- Jackson State University, MS
- Jarvis Christian College, Hawkins, TX
- University of Texas at El Paso
- National Hispanic University, San Jose, CA
- Fort Belknap College, Harlem, MT

The PACE/MSET grant program is sponsored by the Office of Equal Opportunity Programs, Washington, DC.

The grant program targets institutions of higher education, especially Historically Black Colleges and Universities and Hispanic Serving Institutions that meet the eligibility criteria outlined in Public Law 102-325 in the higher education amendments of 1992, as well as Tribal Colleges and other minority universities whose student enrollment of underrepresented minorities exceeds 50 percent.

-end-

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News Release

National Aeronautics and
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Washington, DC 20546
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For Release

Mark Hess
Headquarters, Washington, DC
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April 12, 1995

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RELEASE: 95-49

COLUMBIA COMPLETES MAINTENANCE PERIOD

The Space Shuttle Columbia, the oldest Space Shuttle in NASA's four-Orbiter fleet, rolled out of Rockwell's modification center, Palmdale, CA, this week completing a six-month Orbiter maintenance period.

Today, on the 14th anniversary of the first Space Shuttle launch, the 747 Shuttle Carrier Aircraft, with the 100-ton reusable spaceplane bolted on top, is at Ellington Field, near the Johnson Space Center, Houston, en route to the Kennedy Space Center, FL, to be readied for its 18th mission, currently set for September.

Astronaut John Young, a veteran pilot who flew Gemini, Apollo and Space Shuttle missions, commanded the STS-1 flight. Rookie astronaut Robert Crippen, who would go on to command three flights on the Space Shuttle and take over the reins of the program as its director, was the pilot on that first flight.

-more-

Columbia arrived in Palmdale for its third modification and inspection period in October 1994. Maintenance periods are conducted on each Orbiter every three years. Previous inspection/modification periods were conducted in 1984-85 and 1991-92.

While in Palmdale, more than 66 improvements and modifications were made to Columbia. The enhancements were to improve performance, meet mission requirements or reduce turnaround time. Included were wiring changes to allow Shuttle crews to monitor downlink data on laptop computers, installing filters in hydrogen flow control valves to reduce the potential for contamination, and corrosion control measures.

Engineers also performed a structural inspection on Columbia. Nearly 488 nondestructive and visual inspections, using boroscopes, ultrasonic devices, eddy currents and X-rays were performed. These inspections showed Columbia to be in excellent condition, and fully capable of meeting its 100-mission lifetime requirement.

Rockwell completed construction of Columbia in March 1979. Its 17 missions to date have accumulated more than 62 million miles and over 2,300 orbits.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

Space Shuttle Columbia (OV-102) Facts

Columbia became the first Space Shuttle to fly into Earth orbit when it rocketed Commander John Young and Pilot Robert Crippen into space on April 12, 1981.

Columbia's first mission lasted 54 hours, 20 minutes and 32 seconds during which time the world's first reusable spaceplane circled the globe 36 times and traveled over 1 million miles.

Columbia has made 17 missions into orbit, including the four-flight Orbital Flight Test program. Columbia deployed the first commercial communications satellites launched from the Shuttle and carried up the first flight of the European-built Spacelab laboratory module.

Columbia's next mission will be STS-73, a planned 16-day mission carrying the second United States Microgravity Laboratory. Launch is planned for September.

Miles Flown	62,894,846
Astronauts Flown	88 (including 3 from Germany, 1 from Japan and 1 from Canada)
Satellites Deployed	4 (SBS, Telesat, Lageos, Satcom KU)
Satellites Retrieved	1 (LDEF)

Flights of Columbia (OV-102)

Flt.	Crew	Launch Date/Pad	Landing Date/Site	Payload
1. STS-1	Young, Crippen	4/12/81 39A	4/14/81 Edwards AFB	DFI
2. STS-2	Engle, Truly	11/12/81 39A	11/14/81 Edwards AFB	OSTA-1
3. STS-3	Lousma, Fullerton	3/22/82 39A	3/30/82 White Sands, NM	OSS-1
4. STS-4	Mattingly, Hartsfield	6/27/82 39A	7/4/82 Edwards AFB	DoD 82-1
5. STS-5	Brand, Overmyer Lenoir, Allen	11/11/82 39A	11/16/82 Edwards AFB	SBS-C Anik C-3

-more-

	Flt.	Crew	Launch Date/Pad	Landing Date/Site	Payload
6.	51-C	Gibson, Bolden Chang-Diaz, Hawley	1/12/83 39A	1/18/83 Edwards AFB	Satcom Ku 1
7.	STS-9	Young, Shaw, Parker Garriott, Merbold Lichtenberg	11/28/83 39A	12/8/83 Edwards AFB	Spacelab
8.	STS-28	Shaw, Richards Leestma, Adamson Brown	8/8/89 39B	8/13/89 Edwards AFB	DoD
9.	STS-32	Brandenstein, Wetherbee, Dunbar Ivins, Low	1/9/90 39A	1/20/90 Edwards AFB	Syncom IV-5 LDEF retrieve
10.	STS-35	Brand, Gardner, Lounge, Hoffman Parker, Parise	12/2/90 39B	12/10/90 Edwards AFB	Astro-1
11.	STS-40	O'Connor, Gutierrez, Jernigan, Seddon, Bagian	6/5/91 39B	6/14/91 Edwards AFB	SLS-1
12.	STS-50	Richards, Bowersox Dunbar, Baker, Meade, DeLucas, Trinh	6/25/92 39A	7/9/92 KSC	USML-1
13.	STS-52	Wetherbee, Baker Veach, Jernigan Shepherd, MacLean	10/22/92 39B	11/1/92 KSC	Lageos II USMP-1
14.	STS-55	Nagel, Hendricks Ross, Precourt Harris, Walter, Schlegel	4/26/93 39A	5/6/93 KSC	Spacelab D2
15.	STS-58	Blaha, Searfoss, Seddon, McArthur Wolf, Lucid, Fettman	10/18/93 39B	11/1/93 Edwards AFB	SLS-2
16.	STS-62	Casper, Allen, Thuot Geman, Ivins	3/4/94 39B	3/18/94 KSC	OAST-2 USMP-2
17.	STS-65	Cabana, Halsell, Hieb Walz, Chiao, Thomas Mukai	7/8/94 39A	7/23/94 KSC	IML-2

News Release

National Aeronautics and
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For Release

April 13, 1995

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NOTE TO EDITORS: N95-22

HUBBLE VIEWS PLANET NEPTUNE AND ASTEROID VESTA

The latest surprising findings on the planet Neptune and the asteroid Vesta will be presented in the next Space Astronomy Update at 2 p.m. EDT, Wed., April 19, in the NASA Headquarters auditorium, 300 E St. SW, Washington, DC.

Entitled, "Hubble Looks at the Outer Solar System", the event will feature panelists Dr. Heidi Hammel of the Massachusetts Institute of Technology, and Dr. Ben Zellner of Georgia Southern University.

Hubble images will show the new dark spot in the northern hemisphere of the distant planet Neptune. Only last June Hubble revealed that a great dark spot in the southern hemisphere -- discovered by the Voyager 2 spacecraft in 1989 -- had mysteriously disappeared.

Hubble images of the asteroid Vesta will show a complex surface with a geology similar to that of terrestrial worlds such as Earth or Mars. The battered ancient surface -- the oldest terrain ever seen in the Solar System -- allows astronomers to peer below the crust. Vesta is unique in being the only asteroid astronomers actually can study in a laboratory -- thanks to a collision blasting a piece of the asteroid's surface into space which eventually fell to Earth. The fragment will be displayed at the event.

The event will be carried live on NASA Television with questions and answers from participating NASA Centers. NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

- end -

Video Advisory

National Aeronautics and
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For Release

April 13, 1995

VIDEO ADVISORY: V95-44

STUDENTS TALK LIVE WITH MIR 18 CREW ON NASA TV FRIDAY

On Friday students from Russia and the United States will speak with American astronaut Norm Thagard and his Russian cosmonaut crewmates during live interviews carried on NASA TV. The first group of students, from Russia, will talk with the Mir crew from 9:29-9:37 a.m. EDT. A second group of students from NASA Headquarters, Washington, DC, will talk with the Mir crew from 10:30-11 a.m. EDT. Both sets of interviews will be replayed as the top feature during Friday's video news file. Following the Mir footage, NASA TV will highlight how NASA technology has improved telemedicine to aid children in Harlingen, TX. Footage celebrating the Space Shuttle Columbia's 14th anniversary will be replayed, as well as a rebroadcast of Tuesday's Mir 18 press conference. Footage showing Wednesday's Russian Progress 277 resupply ship docking with Mir will close out Friday's video feed.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Mir 18 crew talks to students from around the world</i>	TRT:	TBD
ITEM #2: <i>Interview with student on conversation with Mir crew</i>	TRT:	TBD
ITEM #3: <i>Telemedicine aids Texas children</i>	TRT:	TBD
ITEM #4: <i>Interview -- Michail Weingarten on telemedicine benefits</i>	TRT:	:54
ITEM #5: <i>Interview -- Dr. John Howe on telemedicine in rural areas</i>	TRT:	:33
ITEM #6: <i>Columbia modifications complete</i>	TRT:	4:14
ITEM #7: <i>Columbia's first mission STS-1</i>	TRT:	4:44
ITEM #8: <i>Replay of Wednesday Mir 18 news conference with Thagard</i>	TRT:	19:37
ITEM #9: <i>Resupply capsule docks with Mir</i>	TRT:	3:49

All TRT's are approximate and subject to change.

Public Affairs Contacts

Mir 18/Progress docking
Telemedicine
Columbia anniversary

Rob Navias, 713/483-5111
Don Haley, 805/258-3456
Kyle Herring, 713/483-5111

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

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NewsRelease

National Aeronautics and
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Mark Hess/Ray Castillo
Headquarters, Washington, DC
(Phone: 202/358-1778)

For Release

April 14, 1995

Kyle Herring
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-50

CREWS SELECTED FOR THIRD, FOURTH SHUTTLE/MIR DOCKING MISSIONS

Five astronauts have been selected to join Air Force Colonel Kevin P. Chilton on Space Shuttle mission STS-76 next March, Atlantis' third flight to dock with Russia's space station Mir. The flight also will include a spacewalk and dropoff of an astronaut to stay five months on the orbiting laboratory.

Joining Chilton (named commander in November 1994) are Pilot Richard A. Searfoss (Lt. Col., USAF), and Mission Specialists Shannon W. Lucid, Ph.D., Linda M. Godwin, Ph.D., Michael R. "Rich" Clifford (Lt. Col., USA), and Ronald M. Sega, Ph.D.

A crew of five astronauts will join Commander William F. Readdy (Cdr., USN Reserve) on the fourth Shuttle docking mission with Russia's space station Mir in August 1996.

Readdy was named STS-79 commander in November 1994 and will be joined by Pilot Terrence W. Wilcutt (Lt. Col., USMC), and Mission Specialists Tom Akers (Lt. Col., USAF), Jay Apt, Ph.D. and Carl E. Walz (Lt. Col., USAF). Astronaut Jerry M. Linenger (Cdr., Medical Corps, USN) will launch aboard Atlantis and switch places on Mir with astronaut Shannon W. Lucid. Linenger is expected to stay on Mir for about four months.

STS-76 Mission Summary

During the 10-day mission, Atlantis will be docked to Mir for five days during which 1,300 pounds of water and 1,900 pounds of logistical equipment will be transferred to the space station. When Atlantis undocks, Lucid will remain on board for a five-month stay to conduct a variety of biomedical and material science experiments. She will return to Earth on Atlantis' next visit to Mir, STS-79, in August. Lucid and her backup, John Blaha, have been training since February in Star City, Russia.

-more-

While docked to the space station, Godwin and Clifford will perform a spacewalk to transfer three experiments to the Mir. Hardware for the international Space Station, slated for assembly starting in 1997, also will be evaluated during the spacewalk.

Throughout the mission, life and materials sciences experiments will be conducted in the pressurized Spacehab module mounted in Atlantis' payload bay.

STS-79 Mission Summary

The scientific studies for this 10-day mission will be carried out in two Spacehab pressurized modules joined together in Atlantis' payload bay. The modules also will house logistical equipment which will be transferred from the Orbiter to Mir during the five days of docked operations. One thousand three hundred pounds of water and 1,900 pounds of supplies will be transferred to the station.

-end-

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STS-76 Crew Biographies

Chilton, 40, has flown twice aboard Endeavour -- STS-49 in May 1992 and STS-59 in April 1994. He earned a masters degree in mechanical engineering from Columbia University in 1977. Chilton was born in Los Angeles, CA.

Searfoss, 38, flew on the STS-58 life sciences mission of Columbia in October 1993. He earned a master of science degree in aeronautics from the California Institute of Technology on a National Science Foundation Fellowship in 1979. Searfoss considers Portsmouth, NH, his hometown.

Godwin, 42, flew on Atlantis' STS-37 mission in April 1991 and Endeavour's STS-59 mission in April 1994. She currently is deputy chief of the Astronaut Office. Godwin received her masters and doctorate degrees in physics from the University of Missouri in 1976 and 1980, respectively. Her hometown is Jackson, MO.

Lucid, 52, has flown four times aboard the Shuttle. She was a mission specialist on STS 51-G in June 1985, STS-34 in October 1989, STS-43 in August 1991 and STS-58 in October 1993. Lucid received her master of science and doctorate of philosophy degrees in biochemistry from the University of Oklahoma in 1970 and 1973, respectively. She considers Bethany, OK, her hometown.

Clifford, 42, has flown twice on the Shuttle -- aboard Discovery on STS-53 in December 1992 and on Endeavour's STS-59 mission as a crewmate of Godwin's. He has a 1982 masters degree in aerospace engineering from the Georgia Institute of Technology. Clifford considers Ogden, UT, his hometown.

Sega, 42, flew on Discovery's STS-60 mission in February 1994, the first joint U.S./Russian Space Shuttle mission. He recently returned from Star City, Russia, where he was NASA manager of operational activities supporting training and preparation of astronauts at the Gagarin Cosmonaut Training Center. Sega received a doctorate in electrical engineering from the University of Colorado in 1982. He considers Northfield, OH, and Colorado Springs, CO, to be his hometowns.

STS-79 Crew Biographies

Readdy, 43, has flown on two Shuttle missions, STS-42 in January 1992 and STS-51 in September 1993 -- both aboard Discovery. He recently served a tour in Star City, Russia, as NASA manager of operational activities. Readdy earned a bachelor of science degree in aeronautical engineering from the Naval Academy in 1974. He considers McLean, VA, his hometown.

Wilcutt, 45, was pilot on Endeavour's STS-68 mission in September/October 1994. A native of Russellville, KY, he earned a bachelors degree in math from Western Kentucky University in 1974.

Akers, 43, flew on STS-41 aboard Discovery in October 1990 and STS-49 and STS-61 aboard Endeavour. He most recently has been the deputy director of the Mission Operations Directorate at Johnson Space Center. Akers earned a master of science degree in applied mathematics from the University of Missouri-Rolla in 1975. His hometown is Eminence, MO.

Apt, 45, has flown once on Atlantis and twice on Endeavour -- STS-37 in April 1991, STS-47 in September 1992 and STS-59 in April 1994. He earned a doctorate in physics from the Massachusetts Institute of Technology in 1976. Apt considers Pittsburgh, PA, his hometown.

Walz, 39, flew on Discovery's STS-51 mission in September 1993 and Columbia's STS-65 mission in July 1994. He has a master of science degree in solid state physics from John Carroll University earned in 1979. Walz was born in Cleveland, OH.

Lucid, 52, has flown four times aboard the Shuttle. She was a mission specialist on STS 51-G in June 1985, STS-34 in October 1989, STS-43 in August 1991 and STS-58 in October 1993. She received her master of science and doctorate of philosophy degrees in biochemistry from the University of Oklahoma in 1970 and 1973, respectively. She considers Bethany, OK, her hometown.

Linenger, 40, flew on Discovery's STS-64 mission in September 1994. He earned a doctorate in medicine from Wayne State University in 1981 and a master of public health degree in health policy and a doctor of philosophy degree in epidemiology from the University of North Carolina in 1989. Linenger considers Eastpointe, MI, his hometown.

Video Advisory

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Dianne Hill
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For Release

April 16, 1995

VIDEO ADVISORY: V95-45

NASA TV EXAMINES OZONE DEPLETION MONDAY

As part of a week-long series that will look at issues that impact Earth's environment in conjunction with Earth Day activities, NASA TV Monday will be examining how ozone depletion may effect our planet's environment. Monday's first feature will show animation of NASA's Upper Atmosphere Research Satellite (UARS), a satellite used to read ozone levels around the world. UARS data has provided conclusive evidence that chloroflouro carbons are the cause of the Antarctic ozone hole. A video showing progressive ozone depletion over the Southern Hemisphere will be aired, as well as images from instruments aboard the UARS that show a cloud of ozone-destroying chlorine monoxide 19 kilometers above the Northern Hemisphere. Following the ozone depletion features, NASA TV will highlight how NASA technology has improved telemedicine to aid children in Harlingen, TX.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Atmospheric Research Satellite -- animation</i>	TRT: 3:09
ITEM #2: <i>Ozone hole evolution</i>	TRT: 5:23
ITEM #3: <i>Ozone measurement</i>	TRT: :52
ITEM #4: <i>Telemedicine aids Texas children</i>	TRT: 3:51
ITEM #5: <i>Interview -- Michail Weingarten on telemedicine benefits</i>	TRT: :53
ITEM #6: <i>Interview -- Dr. John Howe on telemedicine in rural areas</i>	TRT: :33

All TRT's are approximate and subject to change.

Public Affairs Contacts

Ozone depletion, Earth Day activities
Telemedicine

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Don Haley, 805/258-3456

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

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For Release

April 17, 1995

VIDEO ADVISORY: V95-46

NASA TV DISPLAYS MOUNT PINATUBO RADAR IMAGES

Continuing NASA's week-long series on issues that impact Earth's environment, NASA Television will air images taken by the Space Radar Laboratory last October of ash distribution from the 1991 eruption of Mount Pinatubo. The Space Radar Laboratory has flown twice aboard the Space Shuttle, giving researchers an unprecedented view of our home planet. According to these images, mud flows continue to flood river valleys after heavy rains. Other images include the Kliuchevskoi volcano on the Aleutian Islands, photographed by Space Shuttle astronauts as it erupted in September 1994, and earthquake damage to Los Angeles. NASA space-based radar technology may, in the future, help develop ways to mitigate earthquake damage.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Mount Pinatubo Radar Images</i>	TRT: 2:20
ITEM #2: <i>Space View of Volcanic Eruption</i>	TRT: :57
ITEM #3: <i>L.A. Earthquake, January 1994</i>	TRT: 1:47
ITEM #4: <i>Atmospheric Research Satellite -- animation</i>	TRT: 3:09
ITEM #5: <i>Ozone hole evolution</i>	TRT: 5:23
ITEM #6: <i>Ozone measurement</i>	TRT: :52
ITEM #7: <i>Telemedicine aids Texas children</i>	TRT: 3:51
ITEM #8: <i>Interview -- Michail Weingarten on telemedicine benefits</i>	TRT: :53
ITEM #9: <i>Interview -- Dr. John Howe on telemedicine in rural areas</i>	TRT: :33

All TRT's are approximate and subject to change.

Public Affairs Contacts

Ozone depletion, Earth Day activities
Telemedicine

Brian Dunbar, 202/358-1547
Don Haley, 805/258-3456

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

April 18, 1995

Dianne P. Hill
Headquarters, Washington, DC
(Phone: 202/358-1732)

VIDEO ADVISORY: V95-47

HUBBLE, MIR AND EARTH DAY HIGHLIGHT NASA TV WEDNESDAY

Continuing Earth Day coverage, a live status report from Russia's Mir space station, and new Hubble Space Telescope views of planet Neptune and the asteroid Vesta highlight NASA Television feeds on Wednesday. At 10:55 a.m. EDT, U.S. astronaut Norm Thagard will provide a live status report from the Mir space station. His presentation will include video tape of life aboard the orbiting laboratory, and a discussion of preparations for the arrival of the Space Shuttle Atlantis in June. Also on Wednesday, NASA will present a "Space Astronomy Update" at 2 p.m. EDT, featuring recent Hubble views of planet Neptune and the asteroid Vesta. Research with the Hubble shows that the face of Neptune has changed since last visited by the Voyager 2 spacecraft in 1989. Hubble also is allowing astronomers to learn more about the ancient asteroid Vesta. Ocean topography, ocean currents and the effect of the El Nino phenomenon on global weather patterns will be featured in the daily video file, airing at Noon, 3 p.m., 6 p.m. and 9 p.m. EDT.

NASA TV also will provide stations an opportunity to conduct live interviews with experts on Neptune and El Nino as time permits. Dr. Heidi Hammel of the Massachusetts Institute of Technology will be available for interviews regarding the changes on Neptune from 3:30 to 4:00 p.m. EDT. Tony Busalacchi of NASA's Goddard Space Flight Center, will be available for interviews about El Nino from 4 to 6 p.m. EDT. To schedule a live interview, call Patrick Mellody at 202/358-1737.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM # 1: <i>Mir 18 Status Report</i>	TRT: 15:00
ITEM # 2: <i>Rotation of the Asteroid Vesta</i>	TRT: :41
ITEM # 3: <i>Changing Cloud Patterns on Neptune</i>	TRT: 1:09
ITEM # 4: <i>Ocean Topography - animation</i>	TRT: 1:24
ITEM # 5: <i>Ocean Currents - animation</i>	TRT: 2:03
ITEM # 6: <i>Mount Pinatubo Radar Images</i>	TRT: 2:02
ITEM # 7: <i>Space View of Volcanic Eruption</i>	TRT: :57
ITEM # 8: <i>L.A. Earthquake, January 1994</i>	TRT: 1:47
ITEM # 9: <i>U.S. Students Talk to Mir 18 Crew</i>	TRT: 1:46
ITEM #10: <i>Interview - Paul Park</i>	TRT: 1:31

All TRT's are approximate and subject to change.

Public Affairs Contacts

Ozone depletion, Earth Day activities

Brian Dunbar, 202/358-1547

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
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Dianne P. Hill
Headquarters, Washington, DC
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For Release

April 19, 1995

VIDEO ADVISORY: V95-48
AIR DATE: Thursday, April 20, 1995

EARTH DAY COVERAGE CONTINUES ON NASA TV THURSDAY

Earth Day coverage continues as NASA Television examines deforestation in the Amazon rainforest and spacecraft data on ocean currents and climate changes. Ocean circulation regulates the world's climate and distributes heat around the globe. Utilizing data from the TOPEX/Poseidon satellite NASA researchers can collect and compare data on worldwide weather patterns.

Changing cloud patterns on Neptune also are highlighted on NASA Television from images collected by the Hubble Space Telescope.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM # 1:	<i>Amazon Rainforest</i>	TRT:	1:32
ITEM # 2:	<i>Rainforest Depletion</i>	TRT:	1:00
ITEM # 3:	<i>Rotation of the Asteroid Vesta</i>	TRT:	:41
ITEM # 4:	<i>Changing Cloud Patterns on Neptune</i>	TRT:	1:09
ITEM # 5:	<i>El Nino</i>	TRT:	4:33
ITEM # 6:	<i>Ocean Topography - animation</i>	TRT:	1:24
ITEM # 7:	<i>Ocean Currents - animation</i>	TRT:	2:03
ITEM # 8:	<i>Mir 18 Crew Talks to Kids in the U.S.</i>	TRT:	28:02

All TRT's are approximate and subject to change.

Public Affairs Contacts

Earth Day activities
Mir Space Station

Brian Dunbar, 202/358-1547
Mark Hess, 202/358-1776

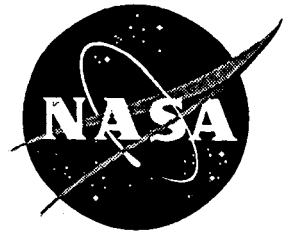
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
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Washington, DC 20546
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Jim Cast
Headquarters, Washington, DC
(Phone: 202/358-1779)

For Release

April 19, 1995

June Malone/Bob Lessels
Marshall Space Flight Center, AL
(Phone: 205/544-0034)

RELEASE: 95-51

NASA, CHICAGO FIRE DEPARTMENT SIGN AGREEMENT

Fire fighting could be safer and more efficient in the future thanks to an agreement signed today between NASA and the City of Chicago.

The agreement opens the door for NASA's Marshall Space Flight Center, Huntsville, AL, and the Chicago Fire Department to work together to apply space program technologies to improving fire fighting and other emergency services.

Fire Commissioner Raymond E. Orozco met with NASA Administrator Daniel S. Goldin and Marshall Director Porter Bridwell in Chicago at 2 p.m. CDT today to sign the Space Act agreement. They also began discussing various technologies that could be transferred to the department to enhance fire and other emergency services.

"The Chicago Fire Department is a strong innovator in testing, developing and adopting new methodologies and technologies for emergency services," said Goldin. "NASA is looking forward to working with them to explore ways space technology can be used to enhance emergency services. Ultimately, it will be the American people who benefit from what we accomplish here."

A number of candidate activities have already been identified for joint study. The Chicago firefighters' principal interest is in developing a personnel locator system which will enable on-scene authorities to locate, track and, if necessary, rescue firefighters within a 2,400-foot area of operations. This also would enhance the command and control capabilities of senior people directing fire-fighting operations.

-more-

Chicago's second priority is in having NASA, through its Marshall Center, attempt to adapt dynamic structural analysis techniques to determine if a structure is in imminent danger of collapse. Such a device might be able to provide in real time the vibration "signature" of a structure. Studies have indicated that there is a "signature" change prior to a structure collapsing. Such a device would provide fire officials with a means of determining when a structure has to be evacuated by firefighters, potentially saving them from harm.

The Chicago Fire Department also is interested in developing a new portable air-breathing apparatus for use by firefighters. The current device has several drawbacks including expense, weight and a long activation time. NASA's knowledge of liquid oxygen technology will form the basis for an evaluation of the feasibility of using liquid oxygen in a new breathing apparatus.

Other research possibilities include identifying the location of an emergency 911 call made from a cellular telephone, and developing the capability to warn hearing impaired drivers of an approaching emergency vehicle. The Marshall Center already has been working on such an Emergency Vehicle Alerting System. This device would assist drivers with hearing loss and those operating in a high noise environment, such as a school bus full of children. The system would alert the driver and provide information on the emergency vehicle's distance and direction of approach.

- end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

NewsRelease



National Aeronautics and
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For Release

Donald Savage
Headquarters, Washington, DC
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April 19, 1995
EMBARGOED UNTIL: 2:00 PM EDT

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RELEASE: 95-52

NASA'S HUBBLE TELESCOPE MAPS THE ANCIENT SURFACE OF VESTA

Hubble Space Telescope images of the asteroid Vesta are providing astronomers with a glimpse of the oldest terrain ever seen in the solar system and a peek into a broken-off section of the "mini-planet" that exposes its interior.

Hubble's pictures provide the best view yet of Vesta's complex surface, with a geology similar to that of terrestrial worlds such as Earth or Mars. The asteroid's ancient surface, battered by collisions eons ago, allows astronomers to peer below the asteroid's crust and into the past.

Astronomers also believe that fragments gouged out of Vesta during ancient collisions have fallen to Earth as meteorites, making Vesta only the fourth solar system object, other than Earth, the Moon and Mars, where scientists have a confirmed laboratory sample. (About 50-60 other meteorite types are suspected to have come from asteroids, but positive identifications are more difficult to make.)

"The Hubble observations show that Vesta is far more interesting than simply a chunk of rock in space as most asteroids are," said Ben Zellner of Georgia Southern University. "This qualifies Vesta as the 'sixth' terrestrial planet."

No bigger than the state of Arizona, Vesta offers new clues to the origin of the solar system and the interior makeup of the rocky planets. "Vesta has survived essentially intact since the formation of the planets," Zellner said. "It provides a record of the long and complex evolution of our solar system."

- more -

Resolving features down to 50 miles across, Hubble reveals a surprisingly diverse world with an exposed mantle, ancient lava flows and impact basins. Though only 325 miles (525 kilometers) across, it once had a molten interior. This contradicts conventional ideas that asteroids essentially are cold, rocky fragments left behind from the early days of planetary formation.

Besides providing scientists with direct samples, Vesta's chipped surface allows Hubble to study the asteroid's rocky mantle, giving scientists a unique opportunity to see what a planet looks like below the crust. "Our knowledge of the interior composition of the other terrestrial worlds, the Moon, Mars, Venus, Mercury and even Earth, depends heavily on theory and inference," Zellner said. "Vesta allows us to actually see the mantle and study pristine samples in our laboratories."

Before these observations, only the smaller and less geologically diverse asteroids, Ida and Gaspra, have been observed in detail by the Jupiter-bound Galileo spacecraft. Unlike Vesta, these smaller objects are pieces torn off larger bodies by collisions that occurred perhaps only a few hundred million years ago.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) for NASA, under contract with the Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency (ESA).

- end -

NOTE TO EDITORS: Images and a video depicting Vesta rotating are available to media representatives by calling NASA's Broadcast and Imaging Branch at 202/358-1900. NASA photo numbers are:

	Color:	B&W:
Vesta 24 frames:	95-HC-187	95-H-191
Vesta Meteorite:	95-HC-188	95-H-192

Image files in GIF and JPEG format may be accessed on Internet via anonymous ftp from [ftp.stsci.edu](ftp://ftp.stsci.edu/pubinfo) in /pubinfo:

	GIF	JPEG
Vesta 24 frames:	/pubinfo/gif/Vesta24.gif	/pubinfo/jpeg/Vesta24.jpg
Vesta Meteorite:	/pubinfo/gif/VestMet.gif	/pubinfo/jpeg/VestMet.jpg

The same images are available via World Wide Web from links in URL <http://www.stsci.edu/public.html>, or more directly from <http://www.stsci.edu/Latest.html>

A science backgrounder entitled "Asteroid or Mini-Planet? Hubble Maps the Ancient Surface of Vesta" is available in the Headquarters Newsroom at 202/358-1600.

SCIENCE BACKGROUND

ASTEROID OR MINI-PLANET? NASA'S HUBBLE TELESCOPE MAPS THE ANCIENT SURFACE OF VESTA

VESTA: THE SIXTH TERRESTRIAL PLANET?

Vesta is the most geologically diverse of the large asteroids and the only known one with distinctive light and dark areas -- much like the face of our Moon. Previous ground-based spectroscopy of Vesta indicates regions that are basaltic, which means lava flows once occurred on its surface. This is surprising evidence that the asteroid once had a molten interior, like Earth does.

One possibility is that Vesta agglomerated from smaller material that includes radioactive debris (such as the isotope Aluminum-26) that was incorporated into the core. This radioactive "shrapnel" probably came from a nearby supernova explosion. (In fact a supernova might have triggered the birth of our solar system.) This hot isotope may have melted the core, causing the asteroid to differentiate: heavier, dense material sank to the center while lighter rock rose to the surface. This is a common structure for the terrestrial planets. After Vesta's formation, molten rock flowed onto the asteroid's surface. This happened more than four billion years ago. The surface has remained unchanged since then, except for occasional meteoroid impacts.

One or more large impacts tore away some of the crust exposing a deeper mantle of olivine, which is believed to constitute most of the Earth's mantle. Some of the pieces knocked off Vesta have fallen to Earth as meteorites, which show a similar spectral fingerprint to Vesta's surface composition.

A PIECE OF VESTA FALLS TO EARTH

In October 1960, two fence workers in Millbillillie, Western Australia, observed a fireball heading toward the ground, and pieces of the fallen meteorite were found ten years later. The fragments stood out from the area's reddish sandy soil because they had a shiny black fusion crust, produced by their fiery entry through Earth's atmosphere.

Unlike most other meteorites, this sample can be traced to its parent body, the asteroid Vesta. The meteorite's chemical identity points to Vesta because it has the same unique pyroxene spectral signature. Pyroxene is common in lava flows, meaning that the meteorite was created in an ancient lava flow on Vesta's surface. The structure of the meteorite's mineral grains also indicates it was molten and then cooled. The isotopes (oxygen atoms with varying number of neutrons) in the specimen are unlike the isotopes found for all other rocks of the Earth, Moon and most other meteorites.

- more -

The meteorite also has the same pyroxene signature as other small asteroids, recently discovered near Vesta, that are considered chips blasted off Vesta's surface. This debris extends all the way to an escape hatch region in the asteroid belt called the Kirkwood gap. This region is swept free of asteroids because Jupiter's gravitational pull removes material from the main belt and hurls it onto a new orbit that crosses Earth's path around the Sun.

The Australian meteorite probably followed this route to Earth. It was torn off Vesta's surface as part of a larger fragment. Other collisions broke apart the parent fragment and threw pieces toward the Kirkwood gap, and onto a collision course toward Earth. Meteorites found in other locations on Earth are probably from Vesta too.

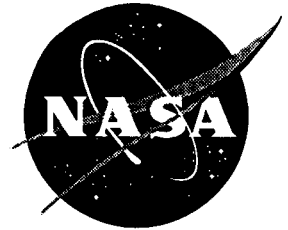
THE OBSERVATION

Ben Zellner (Georgia Southern University), Alex Storrs (Space Telescope Science Institute, Baltimore, MD), Ed Wells (Computer Sciences Corporation, Bethesda, MD), Rudi Albrecht (European Southern Observatory in Garching bei Munich, Germany) and collaborators used Hubble's Wide Field and Planetary Camera 2 (WFPC 2) to collect images of Vesta in four colors of light between November 28 and December 1, 1994. At the time, Vesta was 156 million miles (252 million km) from Earth. In late December 1994, when Vesta was 10 million miles (16 million km) closer to Earth than a month earlier, HST's Faint Object Camera made even higher resolution images. These results are complemented by infrared observations made on December 11, by Olivier Hainaut and colleagues with an adaptive-optics camera on the European Southern Observatory's 3.6-meter telescope in Chile. By combining Hubble and ESO observations, astronomers will be able to produce a geochemical map of an asteroid's surface.

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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For Release

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April 19, 1995
EMBARGOED UNTIL: 2:00 PM EDT

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Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

RELEASE: 95-53

HUBBLE DISCOVERS NEW DARK SPOT ON NEPTUNE

The distant, blue-green planet Neptune has again surprised astronomers with the emergence of a new great dark spot in the cloudy planet's northern hemisphere. The feature was discovered by NASA's Hubble Space Telescope.

Only last June, Hubble images revealed that a great dark spot in the southern hemisphere - discovered by the Voyager 2 spacecraft during its 1989 flyby - had mysteriously disappeared.

The new dark spot is a near mirror-image of the previous feature first mapped by Voyager 2. The northern dark spot discovered by Hubble is accompanied by bright, high-altitude clouds. As atmospheric gases flow up over the spot, they cool to form these methane-ice crystal clouds.

"Hubble is showing us that Neptune has changed radically since 1989," said Heidi Hammel of the Massachusetts Institute of Technology. "New features like this indicate that with Neptune's extraordinary dynamics, the planet can look completely different in just a few weeks."

Like its predecessor, the new spot might be a hole in Neptune's methane cloud tops that gives a peek to lower levels of the atmosphere.

"We weren't surprised the other spot disappeared," said Hammel. "It was kind of 'floppy' because it changed shape as atmospheric circulation carried it around the planet." (By contrast, Jupiter's Great Red Spot, which is similar to Neptune's original spot in relative size and position, has remained stable in appearance for at least 300 years.)

- more -

Hammel points out that studying the dynamics of Neptune's immense atmosphere might lead to a better understanding of Earth's atmosphere. "Neptune's unusual behavior is showing us that though we can make great models of planetary atmospheric circulation, there may be key pieces missing."

Energy from the Sun drives Earth's weather system. However, the mechanism must be very different on Neptune because the planet radiates two times more energy than it receives from the dim, distant Sun.

Neptune's atmosphere might be so dynamic because the cloud tops are warmed from below by this strong internal heat source. A slight change in the temperature differential from cloud bottom to top might trigger rapid, large-scale changes in atmospheric circulation.

Since the 1989 Voyager flyby, astronomers using ground-based telescopes have not been able to resolve the subtle structures in Neptune's variable atmosphere, particularly the low-contrast dark features.

The astronomers don't know how long the new feature will last. For the first time in planetary history though, Hubble will allow astronomers to follow the details of Neptune's atmospheric changes over at least a decade.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. (AURA) for NASA, under contract with the Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency (ESA).

- end -

NOTE TO EDITORS: Images and a video depicting Neptune rotating are available to media representatives by calling NASA's Broadcast and Imaging Branch at 202/358-1900. NASA photo numbers are:

	Color:	B&W:
Neptune 3 visits:	95-HC-189	95-H-193
Neptune Dark Spot:	95-HC-190	95-H-194

Image files in GIF and JPEG format may be accessed via anonymous ftp from ftp.stsci.edu in /pubinfo:

	GIF	JPEG
Neptune 3 visits:	/pubinfo/gif/Nept3.gif	/pubinfo/jpeg/Nept3.jpg
Neptune Dark Spot:	/pubinfo/gif/NeptDS.gif	/pubinfo/jpeg/NeptDS.jpg

The same images are available via World Wide Web from links in URL <http://www.stsci.edu/pubinfo.html> or more directly from <http://www.stsci.edu/Latest.html>

Video Advisory

National Aeronautics and
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Dianne P. Hill
Headquarters, Washington, DC
(Phone: 202/358-1732)

For Release
April 20, 1995

VIDEO ADVISORY: V95-49
AIR DATE: Friday, April 21, 1995

CONTINUING EARTH DAY COVERAGE ON NASA TV FRIDAY

NASA Television on Friday will continue to observe Earth Day by featuring footage about our planet's atmosphere, temperature and global warming. Video will include a climate model showing the predicted temperature increase from the year 1958 to 2039. Animated presentations will show global temperature variation over the past two decades, and illustrate conclusions by NASA scientists that clouds absorb more solar radiation than previously believed.

NASA Television also will show file footage of the launch of Hubble Space Telescope five years ago. Since Hubble was launched, it has rewritten astronomy textbooks and NASA Television footage will chronicle some of the best of Hubble over the past five years.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM # 1:	<i>Climate Control</i>	TRT:	4:22
ITEM # 2:	<i>Global Temperature Variation</i>	TRT:	4:39
ITEM # 3:	<i>Cloud Study Helps Predict Climate Change</i>	TRT:	1:33
ITEM # 4:	<i>Aircraft Used for Cloud Study</i>	TRT:	4:26
ITEM # 5:	<i>Ocean Currents - animation</i>	TRT:	2:03
ITEM # 6:	<i>Hubble Launch and Deployment</i>	TRT:	2:44
ITEM # 7:	<i>Hubble Repair Mission</i>	TRT:	3:33
ITEM # 8:	<i>Supernova 1987A-Halo for a Vanished Star</i>	TRT:	:30
ITEM # 9:	<i>The Orion Nebula-Stellar Birthplace</i>	TRT:	:30
ITEM #10:	<i>The Ring Galaxy-Result of Bull's Eye Collision</i>	TRT:	:30
ITEM #11:	<i>Comet P/Shoemaker-Levy 9 Bombards Jupiter</i>	TRT:	:30
ITEM #12:	<i>Spiral Galaxy M100</i>	TRT:	:30
ITEM #13:	<i>Saturn Storm</i>	TRT:	:30
ITEM #14:	<i>Ring Around a Suspected Black Hole in Galaxy NGC 4261</i>	TRT:	:30
ITEM #15:	<i>Planetary Nebula NGC 6543, Gaseous Cocoon Around Dying Star</i>	TRT:	:30
ITEM #16:	<i>Cygnus Loop-Blast Wave From a Steller Time-bomb</i>	TRT:	:30
ITEM #17:	<i>Weather Forecast for Mars</i>	TRT:	:30

All TRT's are approximate and subject to change.

Public Affairs Contacts

Earth Day activities
Hubble

Brian Dunbar, 202/358-1547
Don Savage, 202/358-0873

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NewsRelease



National Aeronautics and
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Washington, DC 20546
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For Release

Brian Dunbar
Headquarters, Washington, DC
(Phone: 202/358-1547)

April 21, 1995

INTERNET ADVISORY: I95-6

NASA UNVEILS MISSION TO PLANET EARTH HOME PAGE

NASA's upgraded home page for Mission to Planet Earth (MTPE) offers users easy access to information on the agency's extensive environmental research. The home page links users to information on Mission to Planet Earth's:

- flight programs, including satellite missions, Space Shuttle flights and airborne and field campaigns;
- scientific research on such topics as climate change, ozone depletion, the Earth's biosphere and volcanoes;
- data sets, Earth observation photos and satellite imagery;
- publications, including educational tools and NASA fact sheets; and
- recent news, such as press releases and research announcements.

People unfamiliar with the program can look into the "What is Mission to Planet Earth?" section for an overview of the program's purpose, philosophy and strategic plan. The MTPE home page can be found in two locations. For text-and-graphics format:

<http://www.usra.edu/mtpe/mtpe.html>

A text-only format is available at:

<http://mercury/hq.nasa.gov/office/mtpe/mtpe.html>

NASA's Mission to Planet Earth is a coordinated research program to study how our global environment is changing. Using the unique perspective available from space, NASA is observing, monitoring and assessing large-scale environmental processes, with an emphasis on climate change.

MTPE satellite data, complemented by aircraft and ground data, are enabling us to better understand environmental changes, to determine how human activities have contributed to these changes and to understand the consequences of such changes. MTPE data, which NASA is distributing to researchers worldwide, are essential to humans making informed decisions about protecting the environment.

- end -

News Release

National Aeronautics and
Space Administration

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For Release

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Headquarters, Washington, DC
(Phone: 202/358-1760)

April 21, 1995

NOTE TO EDITORS: N95-23

PILOT VICKY VAN METER TO ADDRESS NASA DAUGHTERS DAY EVENT

The national "Take Our Daughters to Work" program, initiated by the Ms. Foundation for Women, is coming again this year to NASA Headquarters on Thursday, April 27. The annual event is devoted to inspiring young girls ages 9-15. The Headquarters program, sponsored by the Federal Women's Program and the Women's Advisory Council, will provide the opportunity for daughters of NASA employees to experience working at the space agency's Headquarters for a day.

As part of the morning program beginning at 8:30 a.m. EDT, the girls will hear the experiences of one of the Mercury 13 female astronaut-trainees, Gene Nora Jessen. Following that, the girls will be paired with a mentor, a NASA employee who will go about her/his job activities, and the girls can see the kinds of duties NASA technical and non-technical staff are involved in each day.

At 10:45 a.m. EDT, 13-year old pilot Vicky Van Meter, who piloted a plane from the United States to Europe last summer, will share her experiences with the girls. NASA flight test engineer Marta Bohn-Meyer from the Dryden Flight Research Center will wrap-up the day's events at 3:30 p.m. EDT.

The three speaker events, to be held in the NASA Headquarters Auditorium, 300 E St., SW, Washington, DC, are open to the media.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

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April 21, 1995

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NOTE TO EDITORS: N95-24

TOP TEN IMAGES AND VIDEO OF HUBBLE FIFTH ANNIVERSARY AVAILABLE

The best of NASA's Hubble Space Telescope images and a video retrospective are available to news media covering the fifth anniversary of the Hubble launch on Monday, April 24, 1995. The images and video also will be available on NASA TV today and Monday on the Video File program segment at noon, 3 p.m., 6 p.m. and 9 p.m. EDT.

News media can request Hubble's images in color/B&W prints or slides by calling the Office of Public Outreach at the Space Telescope Science Institute, Baltimore, at 410/338-4707.

The HST 5th Anniversary Image Collection also are available via the Internet in a special Hubble 5th Anniversary Home Page in GIF, JPEG and TIFF formats. For the World Wide Web, follow links in <http://www.stsci.edu/pubinfo/BestOfHST95.html> or browse directories using <http://www.stsci.edu/ftp/pubinfo> and links to gif, jpeg and tiff. Anonymous ftp to [ftp.stsci.edu](ftp://ftp.stsci.edu). GIF files are in /pubinfo/gif, with extension ".gif". JPEG files are in /pubinfo/jpeg, with extension ".jpg". TIFF files are in /pubinfo/tiff, with extension ".tif".

- end -

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

Launius, Roger

From: NASANews
To: press-release-nasa
Subject: The Perspective from Space Is Critical to Earth Studies, Goldin Says
Date: Friday, April 21, 1995 1:48PM

Brian Dunbar
Headquarters, Washington, DC April 21, 1995
(Phone: 202/358-1547)

RELEASE: 95-54

THE PERSPECTIVE FROM SPACE IS CRITICAL TO EARTH STUDIES, GOLDIN SAYS

The following statement by NASA Administrator Daniel S. Goldin was released today to mark the 25th anniversary of Earth Day.

In the 25 years since the first Earth Day, we have changed the way we think about our planet. Apollo astronauts captured the Earth as a blue marble against a vast background of darkness--beautiful, but fragile and finite. Our missions to other planets have revealed them to be fascinating and diverse, but also lacking any obvious signs of life. We know of no place like Earth.

NASA has developed a program, called Mission to Planet Earth, that captures the spirit of exploration and focuses it back on our own planet. Only from space can we obtain the global perspective needed to better understand how all of the parts of the Earth's environment--air, water, land and life--interact and make life possible. Mission to Planet Earth, for which NASA has partners across the U.S. government and around the world, has helped reveal the Earth's secrets.

To give just a few examples:

Working with other agencies and industry, NASA researchers helped establish that human industrial activities were threatening the ozone layer. NASA and the National Oceanic and Atmospheric Administration (NOAA) data now indicate that international treaties designed to protect ozone are beginning to work.

- TOPEX/Poseidon, a satellite developed by NASA and the French space agency, is providing us with our first truly worldwide data on changes in global sea level, and is helping us better track El Nino, a physical change in the Pacific Ocean that dramatically alters weather patterns around the globe.

- NASA researchers were able to track and measure the cooling effect that the 1991 eruption of Mount Pinatubo had on the Earth's climate. Researchers around the world are still studying the volcano's effect on ozone levels in the tropics.

- NASA research is helping us to understand natural disasters: floods, earthquakes and severe storms. By

better understanding them, we can better prepare for them and lessen their damage.

In the longer term, we will need to unravel other mysteries. Will the Earth get warmer? Will sea levels rise, threatening coastal communities? Will rainfall patterns shift? How would climate change affect weather, the frequency of severe storms and the way we live? These are the scientific challenges we will study in the next 25 years.

NASA is also participating in the Administration's initiative "Technology for a Sustainable Future." This program cuts across the government to identify and promote technologies that simultaneously protect the environment and promote economic competitiveness. NASA's part of the initiative, called Insight 2000, is a joint effort with NOAA and the Department of the Interior. This program aims to identify users of environmental data beyond the scientific community--state and local governments, educators, industry, not-for-profit groups--and get useful data to them.

NASA's environmental research goes beyond Mission to Planet Earth. The Office of Aeronautics is working with industry to develop cleaner-burning engines for tomorrow's airplanes. These airplanes will use less fuel and cause less damage to the atmosphere.

Within the agency, NASA has developed an extensive environmental management program in all its activities. We instill efficient management practices through pollution prevention and waste minimization. We embrace the principles of environmental justice and pursue "green" use of resources. We will redouble our commitment to achieve compliance with environmental laws and regulations.

In more than 35 years of space travel, we have looked out at the Universe and found that for the time being the Earth is the only place we can live. We have also looked back and seen that our planet is not a collection of separate environments, but a single global environment, protected by a fragile shell of air. On Earth Day 1995, we look forward to the next 25 years, as NASA continues to help humanity understand its environment and how it is changing.

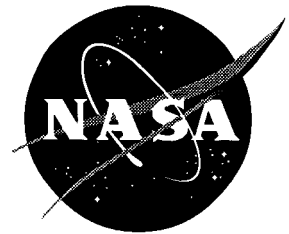
- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Dianne P. Hill
Headquarters, Washington, DC
(Phone: 202/358-1732)

For Release

April 24, 1995

VIDEO ADVISORY: V95-51
AIR DATE: Tuesday, April 25, 1995

NASA TV HIGHLIGHTS SONIC BOOM TESTS

NASA TV will highlight NASA's use of the SR-71 to study sonic booms -- a project that could eventually lead to aircraft designs to minimize the noise levels of sonic booms and their effect on populated areas.

NASA Television also continues an observance of the fifth anniversary of the deployment of the Hubble Space Telescope. File footage includes Hubble images -- which are providing a new view of the universe. NASA TV will show the launch and deploy of Hubble in 1990, and the servicing mission when astronauts successfully replaced the damaged solar array and other equipment in 1993.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM # 1:	<i>Blackbird Sonic Boom Test</i>	TRT:	4:16
ITEM # 2:	<i>Interview - Ed Herring - Sonic Boom tests</i>	TRT:	2:30
ITEM # 3:	<i>Interview - Dave Lux - Sonic Boom Measurements</i>	TRT:	1:30
ITEM # 4:	<i>Interview - Rogers Smith - What Causes Sonic Booms</i>	TRT:	:25
ITEM # 5:	<i>Hubble Launch and Deploy</i>	TRT:	2:43
ITEM # 6:	<i>Hubble Repair Mission</i>	TRT:	3:33
ITEM # 7:	<i>Supernova 1987A-Halo for a Vanished Star</i>	TRT:	:30
ITEM # 8:	<i>The Orion Nebula-Stellar Birthplace</i>	TRT:	:30
ITEM # 9:	<i>The Ring Galaxy-Result of Bull's Eye Collision</i>	TRT:	:30
ITEM # 10:	<i>Comet P/Shoemaker-Levy 9 Bombards Jupiter</i>	TRT:	:30
ITEM # 11:	<i>Spiral Galaxy M100</i>	TRT:	:30
ITEM # 12:	<i>Saturn Storm</i>	TRT:	:30
ITEM # 13:	<i>Ring Around a Suspected Black Hole in Galaxy</i>	TRT:	:30
ITEM # 14:	<i>Cat's Eye Nebula</i>	TRT:	:30
ITEM # 15:	<i>Blast Wave from a Steller Time Bomb</i>	TRT:	:30
ITEM # 16:	<i>Weather Forecast for Mars</i>	TRT:	:30

All TRT's are approximate and subject to change.

Public Affairs Contacts

Sonic Boom Testing
Hubble Space Telescope

Don Haley, 805/253-3456
Don Savage, 202/358-1727

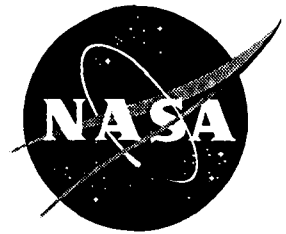
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Donald Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

April 24, 1995

Tammy Jones
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-5566)

Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

RELEASE: 95-56

FIFTH ANNIVERSARY OF HUBBLE LAUNCH OBSERVED TODAY

Today is the fifth anniversary of the launch of NASA's Hubble Space Telescope. Celebrated throughout the world as the finest astronomical instrument ever built, Hubble has provided remarkable new views of the universe which have revolutionized astronomers' thinking about a variety of current astronomical mysteries.

"The Hubble Space Telescope is truly a national scientific treasure," said Dr. Wesley Huntress, Jr., NASA's Associate Administrator for Space Science. "With a rate of discovery that is unprecedented for any modern observatory, Hubble not only has revolutionized astronomy, it has engaged the interest and imagination of the public more than any space science satellite has done before.

"And that may be its most far-reaching and important legacy -- getting a new generation of young people excited about science," Huntress said.

Launch and First Three Years

Launched April 24, 1990, on the Space Shuttle Discovery's STS-31 mission, the Hubble Space Telescope, with a resolving power calculated to be ten times better than any telescope on Earth, was poised to open a new era in astronomy. Within a few months, however, a flaw was discovered in Hubble's main mirror which significantly reduced the telescope's ability to focus.

- more -

The focusing defect was due to spherical aberration, an optical distortion caused by an incorrectly shaped mirror. Instead of being focused into a sharp point, light collected by the mirror was spread over a larger area in a fuzzy halo. Images of objects such as stars, planets and galaxies were blurred. However, on relatively bright objects, Hubble's cameras were still able to provide images far superior to any telescope on the ground.

Program and project management officials, working with the scientific community, developed a plan to take advantage of the telescope's instruments that were not affected by the aberration, such as ultraviolet and spectrographic observations.

During its first three years of operation, Hubble provided significant new information and discoveries about the universe, including astonishing images of supernova 1987A and a disk of cold gas fueling a black hole.

The team also began developing a corrective optics package that, together with a new camera already scheduled for installation in Hubble in 1993, would restore Hubble to its intended imaging capabilities.

The two major instruments planned for installation, the Wide Field/Planetary Camera (WF/PC-II) and the Corrective Optics Space Telescope Axial Replacement (COSTAR), were designed to correct the aberration. WF/PC-II was designed so that the light reaching each of the instrument's four cameras was corrected by relay mirrors polished to a prescription compensating for the incorrect figure produced by Hubble's primary mirror.

COSTAR routed properly focused light to three of Hubble's five instruments. Ball Corp. built Hubble's corrective optics for the Goddard Space Flight Center, Greenbelt, MD.

The seven astronauts selected to service Hubble practiced for nearly a year-and-a-half. They spent hundreds of hours practicing and learning the uses of more than 100 different servicing tools. This mission would be one of the most challenging missions NASA had ever attempted.

Servicing Mission Opens New Era

On December 2, 1993, the STS-61 crew launched on Space Shuttle Endeavour for an 11-day mission with a record five spacewalks planned. Watched by millions worldwide on live television, the astronauts endured long hours of challenging spacewalks to install instruments containing the corrective optics and replaced the telescope's solar arrays, gyroscopes, and other electronic components.

They installed WF/PC-II and replaced the High Speed Photometer with the COSTAR instrument. They also installed a new computer co-processor to upgrade the telescope's computer memory and processing speed, the Solar Array Drive Electronics unit and the Goddard High Resolution Spectrograph Redundancy Kit.

The crew completed everything it set out to do and the mission was declared a success. After five weeks of engineering check-out, optical alignment and instrument calibration, the confirmation of success came as the first images were received on the ground from the space telescope.

NASA Administrator Daniel Goldin was joined in announcing the successes by Dr. John Gibbons, Assistant to the President for Science and Technology, and Sen. Barbara Mikulski (D-MD), at a press conference at Goddard.

"This is phase two of a fabulous, two-part success story," Goldin said at the press conference. "The world watched in wonder last month as the astronauts performed an unprecedented and incredibly smooth series of space walks. Now, we see the real fruits of their work and that of the entire NASA team."

Not only has Hubble advanced science's understanding of the universe, it also is making direct contributions through a variety of technological spinoffs. During 1994 a new, non-surgical breast biopsy technique was developed using imaging Charge Coupled Devices, originally developed for Hubble's Imaging Spectrograph. This technology now enables doctors to precisely locate a suspicious lump in a woman's breast and use a needle, instead of a scalpel, to extract a sample of tissue for study.

Looking Ahead

The Hubble Space Telescope was designed to work on orbit for 15 years, providing an unparalleled observatory for astronomers well into the next century. To keep Hubble running smoothly, three additional servicing missions are planned, similar to but probably not as extensive as the first servicing mission in 1993.

During the next servicing mission, scheduled for February 1997, astronauts will install two new instruments -- the Space Telescope Imaging Spectrograph and the Near Infrared Camera and Multi-Object Spectrograph. The third servicing mission, scheduled for November 1999, will see the installation of the Hubble Advanced Camera for Exploration, which will greatly enhance the telescope's imaging capabilities.

Hubble's Ten Most Important Scientific Discoveries

Hubble program and project scientists selected the following "top ten" list of discoveries from hundreds of findings made over the past five years by scientists using Hubble. The selections were based on their scientific merit and long-term importance in advancing the field of astronomy. Since it became operational in 1990, NASA's Hubble Space Telescope:

- * Offered the first conclusive evidence for the existence of immense black holes, millions or billions of times the mass of Earth's Sun.
- * Showed that the universe might be much younger than had been previously thought. This was accomplished by calculating the universe's expansion rate based on an accurate Hubble distance measurement to a remote galaxy.
- * Gave the first direct visual evidence that the universe is evolving as predicted in Big Bang cosmology, by resolving the shapes of the farthest galaxies ever seen.
- * Discovered that quasars, very distant and remarkably bright objects, are even more mysterious than commonly thought because many do not dwell in the cores of galaxies, but are isolated in space.
- * Suggested that dark matter in the universe is more exotic than previously thought, by finding that nature doesn't make enough of the extremely small Red Dwarf stars that were once a leading candidate for the universe's "missing mass."
- * Supported the Big Bang theory by refining estimates of the amount of deuterium in space, an element created in the initial cosmic fireball that gave birth to the universe.
- * Solved the mystery of intergalactic clouds of hydrogen by showing that they are really gigantic halos of galaxies.
- * Implied that planets, and presumably life, might be abundant in the universe by discovering disks of dust that might be embryonic planetary systems around young stars.
- * Provided important details and surprising findings of the spectacular collisions of comet Shoemaker-Levy 9 with Jupiter last year.
- * Revealed dynamic weather changes on nearly all the planets with a clarity once attainable only with spacecraft flybys. Scientists found that most planets' atmospheres are much more active than previously believed, and the ability of Hubble to 'revisit' the planets allows frequent monitoring similar to Earth weather satellites.

A Photo Gallery Of The Universe: The Best Of Hubble Images 1990-1995

Hubble Space Telescope's dramatic images evoke a sense of awe and wonder. The following is a selection of Hubble's ten most spectacular and important images, selected on the basis of scientific value as well as aesthetic content.

The images are available in color or B&W prints or via the Internet in a special Hubble 5th Anniversary Home Page. See Editor's Note following this release for information on obtaining images or accessing the home page.

SUPERNOVA 1987A - HALO FOR A VANISHED STAR

An eerie, nearly mirror-image pair of red luminescent gas "hula-hoops" framing the expanding debris of a star was seen as a supernova explosion in 1987. April 1994.

NASA photo number: 94-HC-39

THE ORION NEBULA - STELLAR BIRTHPLACE

An immense wall of glowing gases forms a colorful backdrop to dozens of newborn stars, many of which have dust disks -- as revealed by Hubble -- that might be embryonic solar systems. January 1994.

NASA photo number: 94-HC-163

THE RING GALAXY - RESULT OF A BULL'S-EYE COLLISION

A spectacular head-on collision between a spiral galaxy and a smaller intruder sends out a ripple of energy that triggers a firestorm of new star birth, forms a dazzling ring-like structure. January 1995.

NASA photo number: 95-HC-23

COMET P/SHOEMAKER-LEVY 9 BOMBARDS JUPITER

Hubble followed unexpected and dramatic changes in Jupiter's atmosphere caused by collisions with comet fragments. The titanic blasts left Jupiter with a temporary "bruised" appearance, caused by black debris that was tossed high above the giant planet's cloud tops. July 1994.

NASA photo number: 94-HC-188

SPIRAL GALAXY M100

A majestic pinwheel formed by hundreds of billions of stars harbors rare pulsating stars that can yield clues to the size and age of the universe. The galaxy is so far away, Hubble sees it as it appeared at about the time dinosaurs roamed the Earth. January 1994.

NASA photo number: 94-HC-280

SATURN STORM

A rare storm, large enough to swallow Earth, appears near Saturn's equator. High altitude winds give the storm a distinctive arrowhead shape. January 1994.

NASA photo number: 94-HC-556

RING AROUND A SUSPECTED BLACK HOLE IN GALAXY NGC 4261

The gravitational pull of a suspected super-massive black hole forms a Frisbee-like disk of cool gas, at the core of an energetic galaxy. Subsequent Hubble observations of yet another active galaxy confirmed the reality of monstrous black holes -- gravitational "sink holes" that trap everything, even light. November 1992.

NASA photo number: 92-HC-708

PLANETARY NEBULA NGC 6543, GASEOUS COCOON AROUND A DYING STAR

Mysterious stellar fireworks create expanding gas shells and blowtorch-like jets which form a spectacularly intricate and symmetrical structure. The nebula is a fossil record of the late stages of the star's evolution. January 1995.

NASA photo number: 95-HC-24

CYGNUS LOOP - BLAST WAVE FROM A STELLAR TIME-BOMB

High speed gas from a supernova explosion slams into dark cooler clouds of interstellar material. Shocked and heated by this tidal wave of energy, the clouds glow in bright, neon-like colors. February 1995.

NASA photo number: 95-HC-77

WEATHER FORECAST FOR MARS

Wispy clouds, a melting polar ice cap, and a dust-storm free surface all indicate a cool, clear spring time in the Martian northern hemisphere. Hubble also is serving as a weather satellite for studying the climate on other planets. February 1995.

NASA photo number: 95-HC-115

The Space Telescope Science Institute is operated by AURA (the Association of Universities for Research in Astronomy, Inc.) for NASA, under contract with the Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

- end -

EDITOR'S NOTE: The HST Top Ten Images are available to news media representatives by calling the Headquarters Broadcast & Imaging Branch at 202/358-1900, the Goddard Space Flight Center at 301/286-8956 or 286-7277, or the Space Telescope Science Institute at 410/338-4562 (use the NASA photo number listed for each image).

- more -

The "Top Ten Images" also are available via the Internet in a special Hubble 5th Anniversary Home Page in GIF, JPEG and TIFF formats. Users can access this page using the following protocol:

- * Anonymous ftp to ftp.stsci.edu

GIF files are in /pubinfo/gif, with extension ".gif"

JPEG files are in /pubinfo/jpeg, with extension ".jpg"

TIFF files are in /pubinfo/tiff, with extension ".tif"

- * WWW -- follow links in <http://www.stsci.edu/pubinfo/BestOfHST95.html> or browse directories using <http://www.stsci.edu/ftp/pubinfo> and links to gif, jpeg and tiff

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

April 25, 1995

VIDEO ADVISORY: V95-52
AIR DATE: Wednesday, April 26, 1995

LIVE MIR STATUS REPORT ON NASA TV WEDNESDAY

On Wednesday at 10:30 a.m. EDT NASA TV will provide a live status report from the Mir space station with American astronaut Norm Thagard. Thagard will discuss the scientific research he and his Russian crewmates have been conducting aboard the Mir, and what it is like to spend more than a month living in space. Following the status report, Thagard will participate in three one-way downlink interviews with TV stations in Minneapolis, MN, Phoenix, AZ and San Francisco. The interviews will be replayed in their entirety as the first feature of the regular video news file at noon, 3, 6, and 9 p.m. EDT.

Following the status report, NASA TV will air a short video showing quail eggs that have been sent to Mir for microgravity research studies. The eggs will be studied by the Mir crew to analyze how they develop in the space environment. An interview with Dr. Gary Jahns will discuss how research on the eggs will be conducted and the value of such research for learning about microgravity life sciences. NASA TV will then replay footage and interviews on sonic boom tests being conducted using the SR-71 Blackbird aircraft, and will air interviews discussing how sonic booms are created and the value gained by studying them.

LIVE STATUS REPORT FROM MIR WITH NORM THAGARD: 10:30 A.M. EDT

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay -- Mir 18 status report with American astronaut Thagard</i>	TRT: 30:00
ITEM #2: <i>Quail eggs on Mir</i>	TRT: 1:59
ITEM #3: <i>Interview with Dr. Gary Jahns on quail egg research</i>	TRT: 2:23
ITEM #4: <i>Blackbird sonic boom test</i>	TRT: 4:16
ITEM #5: <i>Interview - Ed Herring on sonic boom tests</i>	TRT: 2:30
ITEM #6: <i>Interview - Dave Lux on sonic boom measurements</i>	TRT: 1:30
ITEM #7: <i>Interview - Rogers Smith on what causes sonic booms</i>	TRT: :25

All TRT's are approximate and subject to change.

Public Affairs Contacts

Mir status report
Quail eggs aboard Mir
Sonic boom testing

Rob Navias, 713/483-5111
Ann Hutchison, 415/604-9000
Don Haley, 805/253-3456

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

April 26, 1995

VIDEO ADVISORY: V95-53
AIR DATE: Thursday, April 27, 1995

ATLANTIS TO PAD, TAKE DAUGHTERS TO WORK DAY ON NTV

On Thursday NASA TV will show footage of the roll-out of Space Shuttle Atlantis to launch pad 39A at the Kennedy Space Center, FL, in preparation for a historic Shuttle-Mir docking mission scheduled to launch in late June. Following the Atlantis rollout footage, NASA TV will highlight Agency activities honoring national "Take Your Daughters to Work Day." Highlights will include an interview with teenage pilot Vicki Van Meter, the youngest girl to pilot a single engine plane across the U.S. Van Meter will be the guest speaker during ceremonies at NASA Headquarters, and will discuss her own accomplishments and what it is like to be a role model to thousands of teenage girls.

Following features with Van Meter, NASA TV will replay a Mir 18 mission status report with American astronaut Norm Thagard from Wednesday, as well as pieces about quail eggs and microgravity experiments aboard the Mir. Footage and interviews on sonic boom tests being conducted by NASA as part of the Agency's ongoing aeronautical research will close out the day's video news file.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Space Shuttle Atlantis rollout to launch pad 39A</i>	TRT: TBD
ITEM #2: <i>Teenage flyer talks to NASA youth</i>	TRT: "
ITEM #3: <i>Interview with teenage pilot Vicki Van Meter</i>	TRT: "
ITEM #4: <i>Replay -- Mir 18 status report with American astronaut Thagard</i>	TRT: 30:00
ITEM #5: <i>Quail eggs on Mir</i>	TRT: 1:59
ITEM #6: <i>Interview with Dr. Gary Jahns on quail egg research</i>	TRT: 2:23
ITEM #7: <i>Blackbird sonic boom test</i>	TRT: 4:16
ITEM #8: <i>Interview - Ed Herring on sonic boom tests</i>	TRT: 2:30
ITEM #9: <i>Interview - Dave Lux on sonic boom measurements</i>	TRT: 1:30
ITEM #10: <i>Interview - Rogers Smith on what causes sonic booms</i>	TRT: :25

All TRT's are approximate and subject to change.

Public Affairs Contacts

Space Shuttle Atlantis
Take Your Daughters to Work Day
Quail eggs aboard Mir
Sonic boom testing

Lisa Malone, 407/867-2468
Beth Schmid, 202/358-1600
Mike Mewhinney, 415/604-9000
Don Haley, 805/253-3456

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

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NewsRelease

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Douglas Isbell
Headquarters, Washington, DC
(Phone: 202/358-1753)

April 26, 1995

Ann Hutchison
Ames Research Center, Mountain View, CA
(Phone: 415/604-4968)

RELEASE: 95-57

AVIAN DEVELOPMENT STUDIED ON MIR SPACE STATION

Scientists have taken the first steps toward understanding how microgravity affects the development of birds with the successful "fixing," or preservation, of fertilized quail eggs aboard the Russian space station Mir.

The eggs are part of a group of eggs launched aboard a Russian Progress transport vehicle earlier this month and then transferred to Mir. Crewmembers will fix the remaining eggs at later stages of development before they hatch.

The preserved eggs will be returned to Earth aboard Space Shuttle Atlantis as part of the STS-71 mission. This mission, tentatively scheduled for a June launch, will mark the first time a U.S. Space Shuttle docks with Mir. A second group of fertilized quail eggs is scheduled to be transported to Mir later this year.

The quail experiment, known as Incubator II, is one of the basic biology experiments being conducted as part of the Shuttle/Mir science program. Gary Jahns, Ph.D., is the Shuttle/Mir payload manager at NASA's Ames Research Center, Mountain View, CA.

"The primary objective of the 11 principal investigators is to answer key questions about the effects of microgravity on avian development," Jahns explained. "From the beginning this was developed as a joint U.S./Russian experiment, with investigators from both countries sharing all samples."

Ames' Life Sciences Division developed special fixative containers and glove bags to provide three layers of containment for the potentially hazardous fixatives required by U.S. investigators. "This hardware allows the cosmonauts to work safely with much better fixatives than have been allowed on Mir in the past, enabling far more detailed analysis of returned samples," Jahns said.

-more-

Next year, plans for the experiment are more ambitious. "Current plans are to fly adult quail to Mir in March 1996," Jahns continued. "The first group will include three female and one male quail. During the initial stages of the research, astronauts will put the eggs that we anticipate will be fertilized in space into an on-board incubator. Scientists will study the eggs at various stages of development," Jahns said. They will be returned to Earth either on the Space Shuttle or on a Soyuz vehicle.

"The hardware concepts developed and tested as part of the joint Shuttle/Mir project will be of great benefit to the development of future hardware being designed for the international Space Station," Jahns said. "In addition, using facilities on Mir will give U.S. researchers the unique opportunity to explore many areas of growth and development that have, to date, been unavailable to the U.S. research community."

Jahns said the international cooperation in the Shuttle/Mir program offers tremendous opportunities for both American and Russian scientific communities. "The integration of U.S. and Russian space resources offers the research communities a greater capability to perform critical research than would have been possible if the two programs had remained isolated," he said.

"This avian experiment continues 20 years of fruitful collaboration between NASA and the Russian Institute of Biomedical Problems, located in Moscow," Jahns said.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Laurie Boeder
Headquarters, Washington, DC
(Phone: 202/358-1898)

April 28, 1995

RELEASE: 95-58

HARRIS NAMED DEPUTY CHIEF ENGINEER (AERONAUTICS)

Dr. Wesley L. Harris has been named Deputy Chief Engineer (Aeronautics), NASA Administrator Daniel S. Goldin announced today.

In his new position, Harris, formerly Associate Administrator for the Office of Aeronautics, will provide an independent technical review of NASA aeronautics programs and projects to ensure they are being planned and conducted on a sound engineering basis with proper controls and management of technical risk. Harris will report to the Chief Engineer within the Office of the Administrator.

Dr. Robert E. Whitehead is serving as Acting Associate Administrator for Aeronautics.

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

April 30, 1995

VIDEO ADVISORY: V95-55
AIR DATE: Monday, May 1, 1995

STUDENT PLUTO SPACECRAFT DESIGN ON NASA TV MONDAY

On Monday NASA TV will air footage and interviews with college students who have developed a design for a spacecraft to travel to Pluto. During interviews students will discuss the difficulties of spacecraft design and the challenges they faced to meet the unique specifications needed for a mission to the distant planet. Following the Pluto spacecraft design features, NASA TV will air a video that shows how a computer program using NASA satellite data may help salt water fishermen locate the best "catch of the day." The computer program monitors water clarity and surface temperatures as measured by NASA satellites to help predict the most likely areas in the Gulf of Mexico where fish may be feeding. Monday's video news file will conclude with a replay of footage showing the Space Shuttle Atlantis being rolled out to launch pad 39A at the Kennedy Space Center, FL, in preparation for the upcoming STS-71 mission, planned for launch in June.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>College students design Pluto spacecraft</i>	TRT: 2:45
ITEM #2: <i>Interview with Mark Weaver on spacecraft design</i>	TRT: :27
ITEM #3: <i>Interview with Pascual Wawoe on spacecraft weight requirements</i>	TRT: :39
ITEM #4: <i>Interview with Geoffrey Kater on design specifications</i>	TRT: :59
ITEM #5: <i>NASA technology aids Gulf fishermen</i>	TRT: 4:00
ITEM #6: <i>Space Shuttle Atlantis rollout to launch pad 39A</i>	TRT: 4:38

All TRT's are approximate and subject to change.

Public Affairs Contacts

Pluto spacecraft design
NASA technology aids fishermen
Space Shuttle Atlantis

Ed McNevin, 818/354-9382
Lanee Cobb, 601/688-3341
Lisa Malone, 407/867-2468

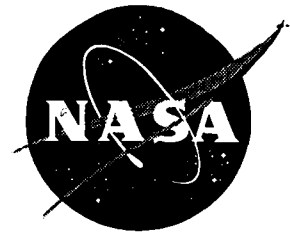
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NewsRelease

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Ray Castillo
Headquarters, Washington, DC
(Phone: 202/358-4555)

For Release
May 1, 1995

NOTE TO EDITORS: N95-26

SPACE STATION VIDEO CONFERENCE SET FOR MAY 4

Media representatives are invited to watch a live Space Station Video Conference from 1-3 p.m. EDT on Thursday, May 4, in the NASA Headquarters Newsroom 8th floor conference room.

NASA experts will discuss and answer questions about current biotechnology research in space, review opportunities for research on the international Space Station, and delineate how scientists and engineers can get involved.

PBS will broadcast the conference on both C-band and Ku-band. For information regarding this satellite transmission, call 1-800/257-2578. Media representatives with questions for participants during the conference can call 1-800/966-9106.

-end-

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 2, 1995

VIDEO ADVISORY: V95-57

LIVE MIR REPORT, WATER PURIFICATION ON NTV WEDNESDAY

NASA TV will air a live mission status report from the Mir space station with American astronaut Norm Thagard at 9:06 a.m. EDT. During the approximately 13 minute report, Thagard will provide NASA TV viewers with insights into living aboard the Russian space station, and the past week's experiments aboard the Mir.

After opening Wednesday's video news file with a replay of Thagard's status report, NASA TV will air a video and interview examining a new water purification system designed for use aboard the international Space Station. The system and custom designed software will automatically control water purification tasks aboard the Space Station, guaranteeing astronauts fresh water while living aboard the orbiting laboratory. NASA's Marshall Space Flight Center, Huntsville, AL, recently tested the effectiveness of the purification system by intentionally exposing water samples to common viruses. An interview with NASA microbiologist Monsi Roman will discuss how the system identified and filtered out the unwanted viruses. The system is scheduled to be launched aboard the U.S. habitation module in 2002. NASA TV will close out Wednesday's video news file by replaying footage and interviews with college students who have developed a design for a spacecraft to travel to Pluto.

LIVE: 9:06 A.M. EDT -- MIR STATUS REPORT WITH AMERICAN NORM THAGARD

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay -- Mir status report with American astronaut Norm Thagard</i>	TRT: 13:00
ITEM #2: <i>Water purification system for the international Space Station</i>	TRT: 5:00
ITEM #3: <i>Microbiologist explains purification process</i>	TRT: 1:27
ITEM #4: <i>Spanish language version -- Microbiologist explains purification</i>	TRT: 2:00
ITEM #5: <i>College students design Pluto spacecraft</i>	TRT: 2:45
ITEM #6: <i>Interview with Mark Weaver on spacecraft design</i>	TRT: :27
ITEM #7: <i>Interview with Pascual Wawoe on spacecraft weight requirements</i>	TRT: :39
ITEM #8: <i>Interview with Geoffrey Kater on design specifications</i>	TRT: :59

All TRT's are approximate and subject to change.

Public Affairs Contacts

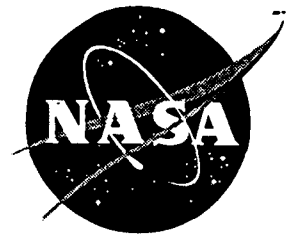
Norm Thagard aboard Mir
Space Station water purification process
Pluto spacecraft design

Rob Navias, 713/483-5111
Mark Hess, 202/358-1778
Ed McNevin, 818/354-9382

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NewsRelease



National Aeronautics and
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For Release

Mark Hess/Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

May 2, 1995

Rob Navias
Johnson Space Center, Houston
(Phone: 713/483-5111)

Bruce Buckingham
Kennedy Space Center, FL
(Phone: 407/867-2468)

RELEASE: 95-59

NASA ALTERS SHUTTLE FLIGHT SCHEDULE

After reviewing processing operations and consulting with Russian Space Agency officials, NASA managers have decided to change the flight order for the launch of two upcoming Space Shuttle missions.

Space Shuttle Discovery, being prepared for the STS-70/Tracking Data Relay Satellite-G mission, will be the next flight of the Shuttle system. Following the STS-70 mission, Atlantis will be launched on Mission STS-71, the first Shuttle-Mir docking mission.

"Both of these flights are very important to NASA's space flight effort," said Brewster Shaw, Director, Space Shuttle Operations. "STS-70 represents the first flight of the new Block I Space Shuttle Main Engine (SSME) with the new Phase II+ powerhead, single coil heat exchanger and new high pressure oxidizer turbopump. The Block I changes will increase SSME durability, reliability and safety margins," he said.

"The STS-71 mission represents a significant step forward in our cooperative effort with the Russians and also the development of the international Space Station. By flying the missions in this order, we are able to make the best use of the work force, Shuttle processing resources and the ability to meet our future manifest assignments," said Shaw.

-more-

-2-

Launch of the STS-70 mission is currently targeted for June 8 with a mission duration of 5-8 days. The official launch date and mission duration will be set following a flight readiness review meeting at the end of this month. The STS-71 mission is targeted for launch in the June 19-24 timeframe. Atlantis' official launch date will be set following its flight readiness review in early June.

- end -

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News Release

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Washington, DC 20546
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For Release

May 2, 1995

Mark Hess/Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

June Malone
Marshall Space Flight Center, Huntsville, AL
(Phone: 205/544-0034)

RELEASE: 95-60

NASA DISCONTINUES WORK ON NOZZLE PRODUCTION AT YELLOW CREEK

NASA, in a move that will save the Agency between \$450 to \$500 million through the year 2012, today directed Thiokol Corp. to discontinue work on construction of a solid rocket motor nozzle fabrication and refurbishment facility at Yellow Creek, MS.

"This was a budget decision, pure and simple," said Space Flight Associate Administrator Wayne Littles. "NASA's been directed to reduce its budget significantly over the course of the next five years, and we could not afford to complete the Yellow Creek facility. It would duplicate a capability we currently have in Utah, and would increase our costs significantly."

To reduce the impact to the Mississippi area, NASA is seeking to turn ownership of the facility over to the state of Mississippi and will provide a grant of about \$10 million to complete the site infrastructure and facilitate the transition to new users. The grant would assist the state in providing security, general site maintenance and other services while locating tenants and finalizing plans for the site -- a period estimated to be about five years.

"State officials we have met with are very supportive of this plan," Littles said. "We are certainly sensitive to the impact terminating this work will have on the local area. But if we implement this plan, Mississippi will take title to a valuable economic asset capable of sustaining a wide range of industrial uses, and NASA will do everything it can to help the state find good tenants for this site."

-more-

Yellow Creek was to be the site for fabrication of an Advanced Solid Rocket Motor (ASRM) for the Space Shuttle program. The ASRM project was canceled by Congress in October 1993.

To capitalize on the ASRM facility and equipment investment at the site, Thiokol Corp. subsequently offered to relocate the solid rocket motor nozzle fabrication and refurbishment work from Utah to Yellow Creek. Currently, there are 90 people working at the Yellow Creek site.

The cost savings that can be realized by taking this action is based on reviews conducted by NASA's Office of Space Flight, the Office of the Inspector General and the Chief Financial Officer.

-end-

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Video Advisory

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David E. Steitz
Headquarters, Washington, DC
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For Release

May 3, 1995

VIDEO ADVISORY: V95-58

AIRBORNE TEACHERS WORKSHOP FEATURED ON NTV THURSDAY

An airborne teachers workshop will be the highlight of Thursday's NASA TV news file. Science teachers from schools near NASA's Ames Research Center, Mountain View, CA, will be shown flying aboard the Kuiper Observatory, a NASA C-141 astronomical research aircraft. NASA flies teachers aboard the Kuiper during observational missions to provide them with insights into how NASA views the stars from the air -- knowledge they can use to aid students in learning about astronomy. Interviews will discuss how flying aboard the Kuiper helps in planning classroom activities.

Following the Kuiper feature, NASA TV will replay Wednesday's mission status report from the Mir space station during which American astronaut Norm Thagard discusses the past week's science activities aboard the Russian space station. NASA TV will re-air feature pieces on a new water purification system that will be used aboard the international Space Station. NASA recently tested the effectiveness of the purification system by intentionally exposing water samples to common viruses. An interview with NASA microbiologist Monsi Roman will discuss how the system identified and filtered out the unwanted viruses. NASA TV will close out Thursday's video news file by replaying footage and interviews with college students who have developed a design for a spacecraft to travel to Pluto.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Airborne teachers workshop</i>	TRT: 4:00
ITEM #2: <i>Interview with Edna DeVore on benefits to teachers of Kuiper flights</i>	TRT: 3:00
ITEM #3: <i>Interview with Michael Ahern on value of the Kuiper program</i>	TRT: 2:00
ITEM #4: <i>Replay -- Science update from Mir space station</i>	TRT: 13:00
ITEM #5: <i>Water purification system for the international Space Station</i>	TRT: 5:00
ITEM #6: <i>Microbiologist explains purification process</i>	TRT: 1:27
ITEM #7: <i>Spanish language version -- Microbiologist explains purification</i>	TRT: 2:00
ITEM #8: <i>College students design Pluto spacecraft</i>	TRT: 2:45
ITEM #9: <i>Interview with Mark Weaver on spacecraft design</i>	TRT: :27
ITEM #10: <i>Interview with Pascual Wawoe on spacecraft weight requirements</i>	TRT: :39
ITEM #11: <i>Interview with Geoffrey Kater on design specifications</i>	TRT: :59

All TRT's are approximate and subject to change.

Public Affairs Contacts

Kuiper Observatory
Norm Thagard aboard Mir
Space Station water purification process

Diane Farrar, 415/604-9000
Rob Navias, 713/483-5111
Mark Hess, 202/358-1778

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News Release

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For Release

May 3, 1995

Mark Hess
Headquarters, Washington, DC
(Phone: 202/358-1778)

Steve Roy
Marshall Space Flight Center, Huntsville, AL
(Phone: 205/544-6535)

RELEASE: 95-61

SPACE STATION COMPLETES MAJOR LIFE SUPPORT SYSTEM TESTS

The international Space Station's water purification system has passed a series of tests designed to evaluate new components and configurations of the Water Recovery System and to challenge the system's capability to remove bacteria, fungi and for the first time, live viruses.

The test series, begun in August 1994 at NASA's Marshall Space Flight Center, Huntsville, AL, characterized the physical, chemical and microbiological composition of the Space Station's expected waste water (shower water, oral hygiene, urine distillate, wet shave, human perspiration). The tests produced recycled water using new performance procedures and hardware dictated by changes in Space Station requirements and lessons learned during earlier water system testing.

The tests featured the first use of a new fully-integrated water processor which automatically tested for the presence of chemical substances, such as organic carbons, iodine and overall water purity. Also, special computer software was developed for automated control very similar to that planned for use on the Space Station.

"This test allowed design engineers to assess the water purification system under the operating conditions that would be expected on the international Space Station," explained Don Holder, life support design engineer in Marshall's Thermal Control and Life Support Systems Division and principal investigator for the test. "Overall, the system was very effective in producing high quality potable water from waste water," said Holder.

"The purification equipment effectively removed high concentrations of microbes in the waste water and provided water with little detectable bacteria and fungi," explained Monsi Roman, life support system microbiologist. "The test series was very challenging, and we are very pleased with the excellent results and overall efficiency of the system."

-more-

The final phase of the water purification tests included, for the first time, an assessment of the system's capability to eliminate viral particles. During the five-day viral test, high concentrations of viruses were steadily introduced in the system. While special filters are used to remove larger contaminants such as skin particles and hair fragments, the smaller viral organisms, along with fungi and bacteria, were destroyed by exposure to the purification system's synthetic cleaning resins and high temperature processor. Throughout the viral test, water samples were collected in order to study the effectiveness of each element of the system and evaluate its role in viral removal.

The viruses selected for the test, MS2, T-1, VD13 and 23356-B1 can only infect specific bacteria. These viruses are common and non-pathogenic for humans. MS2 is frequently used by the Environmental Protection Agency as an indicator for determining the viral effectiveness of drinking water disinfection processes.

"The viral removal capability of the water recycling system appears excellent based upon our preliminary test results," said Christon Hurst, a virologist of the Environmental Protection Agency's Drinking Water Research Division in Cincinnati, OH. Hurst provided on-site support to the viral tests series and supervised post-test evaluation of the data.

Additional testing of the water purification system is planned to determine the actual lifespan of some system hardware, such as filters. The water processor is scheduled to be launched in the U.S. habitation module in 2002.

Marshall is conducting a variety of water purification tests in support of the Space Station Program Office.

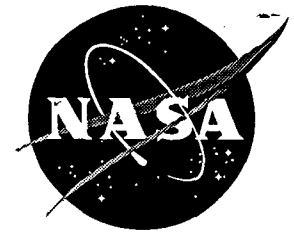
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Video Advisory

National Aeronautics and
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(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 4, 1995

VIDEO ADVISORY: V95-59

NASA - CHOCTAW EDUCATION AGREEMENT ON NTV FRIDAY

Friday's NASA TV news file will open with a feature reviewing an agreement between NASA and the Mississippi Choctaw Tribal Council, Philadelphia, MS. The agreement is designed to enhance the tribe's education system by establishing a teacher enhancement center at the Choctaw reservation. The program's goal is to enhance existing teaching methods and develop new academic and vocational/technical training programs for Choctaw students. By partnering with NASA, Choctaw students will be encouraged to pursue studies in math, science and new technology development.

A video of NASA's Ames Research Center Disaster Assistance Rescue Team returning to California after assisting in the Oklahoma City bombing recovery effort will be aired as the day's second feature. The rescue team spent two weeks helping with recovery efforts in Oklahoma. Following the team's homecoming, NASA TV will re-air features reviewing an airborneastronomy workshop for teachers. Science teachers from schools near the Ames Research Center will be shown flying aboard the Kuiper Observatory, a NASA C-141 astronomical research aircraft. NASA flies teachers aboard the Kuiper during observational missions to provide them with insights into how NASA views the stars from the air -- knowledge they can use to aid students in learning about astronomy. Interviews will discuss how flying aboard the Kuiper helps in planning classroom activities.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>NASA - Choctaw education agreement</i>	TRT: 12:00
ITEM #2: <i>NASA Ames Rescue Team returns from Oklahoma City</i>	TRT: 5:06
ITEM #3: <i>Airborne teachers workshop</i>	TRT: 4:00
ITEM #4: <i>Interview with Edna DeVore on benefits to teachers of Kuiper flights</i>	TRT: 3:00
ITEM #5: <i>Interview with Michael Ahern on value of the Kuiper program</i>	TRT: 2:00

All TRT's are approximate and subject to change.

Public Affairs Contacts

Choctaw education agreement
Ames Disaster Rescue Team
Kuiper Observatory

Lanee Cobb, 601/688-3341
Ann Hutchison, 415/604-9000
Diane Farrar, 415/604-9000

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News Release

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For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

May 5, 1995

NOTE TO EDITORS: N95-27

LOCAL STUDENTS WIN NATIONAL AEROSPACE COMPETITIONS

Several local students are national winners in NASA's 15th annual Space Science Student Involvement Program competition. Twenty-six national winners will present their projects at the National Space Symposium, May 6-10, Hotel Washington, 515 15th St., N.W., Washington, DC.

In the **Mars Expedition** competition, the following eight semi-finalists will compete for first place by presenting proposals of a trip to Mars to a panel of scientists on Monday, May 8, at 1:30 p.m. EDT:

- Kathleen Cusick, Glastonbury H.S., Glastonbury, CT
- Amita Danak, Parma Senior H.S., Parma, OH
- Sara Shelton, Robinson Secondary School, Fairfax, VA
- Brian Pierce, Bonnabel H.S., Metairie, LA
- Travis Caddell, Springtown H.S., Springtown, TX
- Michelle DeDecker, Davis H.S., Kaysville, UT
- Bryn Daisy, East Anchorage H.S., Anchorage, AK
- Luke Bergmann, Montgomery Blair H.S., Silver Spring, MD

On Monday, May 8 at 9 a.m., students in the following competition categories will present their award winning projects:

Interplanetary Art (artwork will be displayed)

- Gregory Metcalf, Quail Summit Elementary School, Diamond Bar, CA
- Jon Frey, Precious Blood Middle School, Dayton, OH
- Jaime Behrens, Rosemount H.S., Rosemount, MN

Future Aircraft/Spacecraft Design

- Ariel Overstreet, Jerick Graves, Megan Brewer, Daniel Karlin, Big Timber Grade School, Big Timber, MT

-more-

Mission To Planet Earth

- Laura Elliott, Angela Feuerborn, Stephanie Spiegel, Holy Trinity Elementary School, Paola, KS

Aerospace Internships

- Supercomputer: Raffi Krikorian, Clarkstown South H.S., West Nyack, NY
- Space Station: Rose Koba, Parma Senior H.S., Parma, OH
- Wind Tunnel: Jason Ernst, Montgomery Blair H.S., Silver Spring, MD
- Microgravity: Nathan Hulse, Davis H.S., Kaysville, UT
- Spacelab: Rachel Mandel, Montgomery Blair H.S., Silver Spring, MD
- Space Telerobotics: Alex Epstein, Montgomery Blair H.S., Silver Spring, MD
- Space Astronomy: Brendan Connell, Montgomery Blair H.S., Silver Spring, MD
- Launch Operations: Brian Blum, Shoreham-Wading River H.S., Shoreham, NY

At 6:30 p.m. on May 9, the students and their teachers will be honored at a banquet at the Hotel Washington. The banquet speaker will be Col. Charlie Bolden, former astronaut and currently the Deputy Commandant of the U.S. Naval Academy.

The Space Science Student Involvement Program is a national competition, co-sponsored by NASA and the National Science Teachers Association, to promote science, mathematics and technology achievement. Over 4,000 students in elementary, junior high and high school competed in five competition categories.

-end-

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For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

May 5, 1995

Lanee Cobb
Stennis Space Center, MS
(Phone: 601/688-3341)

RELEASE: 95-62

NASA SIGNS FIRST NATIVE AMERICAN EDUCATION AGREEMENT

NASA signed the first Native American tribe education agreement with members of the Mississippi Choctaw Tribal Council, Philadelphia, MS.

NASA's Stennis Space Center, MS, will work in partnership with the Mississippi Choctaw Tribal Council to enhance existing mathematics, science and technology education programs and to create new vocational and technical training programs.

"We all have an interest in space," said Roy Estess, Director of Stennis. "We (at NASA) try to capitalize on the human interest in space and leverage that for an increased emphasis in education.

"What we hope to do is to work with the Mississippi Choctaw Tribal Council in enhancing their education system -- providing new tools for the classrooms, new inspirational tools for their teachers -- bring a little piece of the space program into the classrooms," Estess continued.

NASA will establish a teacher enhancement center at the Choctaw reservation. The center will include teacher resource materials such as videotapes, slides, curricula and publications.

Another goal of the initiative is to enhance the school, industry and civic linkage by creating an increased awareness of state-of-the-art technologies in education.

"The technology that has been developed by NASA programs can be transferred into the local communities through education and industry, as well,"

-more-

Choctaw Tribal Chief Phillip Martin said. "Because of this partnership, we can develop new technologies and give our young people an opportunity to learn about state-of-the-art technology. This agreement will provide motivation for students to continue their pursuit of science, math and other courses essential to the world of technology."

"NASA is honored to become formal education partners with the Mississippi Band of Choctaw Indians. It is hoped that this will provide many new educational opportunities for Choctaw students -- from kindergarten to postgraduate -- teachers, parents and the community. This agreement will be the beginning of many avenues of the collaboration between NASA and the Mississippi Choctaw tribe," said Dr. David Powe, manager of Stennis Space Center's educational affairs.

Both NASA and the Mississippi Band of Choctaw Indians will actively conduct education activities within the state of Mississippi and the tri-state region as part of NASA's Tri-State Education Initiative, which includes portions of Mississippi, Alabama and Tennessee.

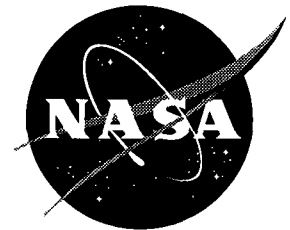
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Video Advisory

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(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 6, 1995

VIDEO ADVISORY: V95-60

DISCOVERY PREPARES FOR FLIGHT ON NASA TV MONDAY

Monday's NASA TV video news file will open with footage of the Space Shuttle Discovery being prepared at the Kennedy Space Center's Vehicle Assembly Building for an upcoming flight in late June. Dramatic footage will show Discovery being lifted and mated to the solid rocket boosters that will carry the Orbiter into space on a satellite deployment mission.

Following the footage of Discovery, NASA TV will re-air a feature reviewing an agreement between NASA and the Mississippi Choctaw Tribal Council, Philadelphia, MS. The agreement is designed to benefit the tribe's education system by establishing a teacher enhancement center at the Choctaw reservation. A video of NASA's Ames Research Center Disaster Assistance Rescue Team returning to California after assisting in the Oklahoma City bombing recovery effort will then be replayed. Following the team's homecoming, NASA TV will re-air features reviewing an airborne astronomy workshop for teachers. Science teachers from schools near the Ames Research Center will be shown flying aboard the Kuiper Observatory, a NASA C-141 astronomical research aircraft. NASA flies teachers aboard the Kuiper during observational missions to provide them with insights into how NASA views the stars from the air -- knowledge they can use to aid students in learning about astronomy. Interviews will discuss how flying aboard the Kuiper helps in planning classroom activities.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Space Shuttle Discovery mated to solid rocket boosters</i>	TRT: 6:00
ITEM #2: <i>NASA - Choctaw education agreement</i>	TRT: 5:03
ITEM #3: <i>NASA Ames rescue team returns from Oklahoma City</i>	TRT: 5:06
ITEM #4: <i>Airborne teachers workshop</i>	TRT: 3:54
ITEM #5: <i>Interview with Edna DeVore on benefits to teachers of Kuiper flights</i>	TRT: 2:53
ITEM #6: <i>Interview with Michael Ahern on value of the Kuiper program</i>	TRT: 2:13

All TRT's are approximate and subject to change.

Public Affairs Contacts

Discovery preparations
Choctaw education agreement
Ames Disaster Rescue Team
Kuiper Observatory

Lisa Malone, 407/867-2468
Lanee Cobb, 601/688-3341
Ann Hutchison, 415/604-9000
Diane Farrar, 415/604-9000

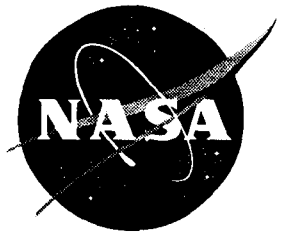
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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Mark Hess
Headquarters, Washington, DC
(Phone: 202/358-1776)

For Release

May 8, 1995

Kari Fluegel
Johnson Space Center, Houston
(Phone: 713/483-5111)

NOTE TO EDITORS: N95-28

BRIEFINGS FOR AMERICA'S 100TH HUMAN FLIGHT SET FOR MAY 15-16

Astronauts, flight controllers and scientists will discuss NASA's upcoming 100th human space flight, designated STS-70, during pre-flight briefings set for May 15-16.

Space Shuttle Discovery is currently targeted to be launched from the Kennedy Space Center, FL, June 8, and will carry a communications satellite and a myriad of scientific experiments to orbit.

The satellite, known as TDRS-G, will enhance the current capabilities of NASA's Tracking and Data Relay Satellite System which provides communications, tracking, telemetry, data acquisition and command services essential for the Space Shuttle, the Hubble Space Telescope, the Compton Gamma Ray Observatory and many other low-Earth orbiting spacecraft.

STS-70 also will be the first flight of an upgraded main engine for the Space Shuttle Orbiter, known as the Block 1 engine. The Block 1 engine uses a new high pressure liquid oxidizer turbopump that is expected to increase safety margins and the reliability of the Shuttle main engines.

The pre-flight briefings will include discussions of the mission objectives and the Block 1 engine. Briefings will originate from the Johnson Space Center (JSC), Houston, TX; the Goddard Space Flight Center (GSFC), Greenbelt, MD; and the Marshall Space Flight Center (MSFC), Huntsville, AL. Two-way question and answer capability will be available from all participating NASA Centers.

- more -

The briefing schedule is as follows: (All times EDT)

May 15, 1995

9 a.m.

Mission Overview (originating from JSC)
Rob Kelso, STS-70 Lead Flight Director

10 a.m.

Tracking and Data Relay Satellite/Inertial Upper Stage Overview
Charles Vanek, TDRS Project Manager (originating from GSFC)
Bob Hughes, Manager, Upper Stages (originating from MSFC)

11 a.m.

Block 1 Engine Overview (originating from MSFC)
Otto Goetz, Deputy Manager, SSME

2 p.m.

Secondary Payloads Overview -- Life Sciences Experiments
(originating from JSC)
Dr. Neal Pellis, Principal Investigator, Bioreactor Demonstration System
Dr. Jeffrey Alberts, Investigator, Physiological and Anatomical Rodent
Experiment/National Institutes of Health-Rodent Experiment

3 p.m.

Secondary Payloads Overview -- Department of Defense Experiments
(originating from JSC)
Captain Craig R. Lamb (USAF), STS-70 DOD Payloads Mission Manager

May 16, 1995

2 p.m.

STS-70 Crew News Conference (originating from JSC)
Terence "Tom" Henricks, Commander
Kevin Kregel, Pilot
Don Thomas, Mission Specialist 1
Nancy Currie, Mission Specialist 2
Mary Ellen Weber, Mission Specialist 3

NASA Television will carry all briefings live on Spacenet 2, Transponder 5, Channel 9 at 69 degrees West longitude. The transponder frequency is 3880 MHz with audio at 6.8 MHz. The polarization is horizontal.

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 8, 1995

VIDEO ADVISORY: V95-61

DISCOVERY PREPARES FOR NEXT MISSION ON NTV TUESDAY

Tuesday's NASA TV video news file will open with a replay of footage showing the Space Shuttle Discovery being prepared at the Kennedy Space Center's Vehicle Assembly Building for an upcoming flight in late June. Dramatic footage will show Discovery being lifted and mated to the solid rocket boosters that will carry the Orbiter into space on a satellite deployment mission. Following the footage of Discovery, NASA TV will re-air a feature reviewing an agreement between NASA and the Mississippi Choctaw Tribal Council, Philadelphia, MS. The agreement is designed to benefit the tribe's education system by establishing a teacher enhancement center at the Choctaw reservation. A video of NASA's Ames Research Center Disaster Assistance Rescue Team returning to California after assisting in the Oklahoma City bombing recovery effort will then be aired. After the team's homecoming video, NASA TV will re-air features reviewing an airborne astronomy workshop for teachers. Science teachers from schools near the Ames Research Center will be shown flying aboard the Kuiper Observatory, a NASA C-141 astronomical research aircraft. NASA flies teachers aboard the Kuiper during observational missions to provide them with insights into how NASA views the stars from the air -- knowledge they can use to aid students in learning about astronomy. Interviews will discuss how flying aboard the Kuiper helps in planning classroom activities.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Space Shuttle Discovery mated to solid rocket boosters</i>	TRT: 6:00
ITEM #2: <i>NASA - Choctaw education agreement</i>	TRT: 5:03
ITEM #3: <i>NASA Ames rescue team returns from Oklahoma City</i>	TRT: 5:06
ITEM #4: <i>Airborne teachers workshop</i>	TRT: 3:54
ITEM #5: <i>Interview with Edna DeVore on benefits to teachers of Kuiper flights</i>	TRT: 2:53
ITEM #6: <i>Interview with Michael Ahern on value of the Kuiper program</i>	TRT: 2:13

All TRT's are approximate and subject to change.

Public Affairs Contacts

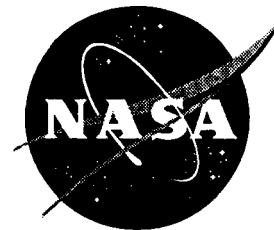
Discovery preparations
Choctaw education agreement
Ames Disaster Rescue Team
Kuiper Observatory

Lisa Malone, 407/867-2468
Lanee Cobb, 601/688-3341
Ann Hutchison, 415/604-9000
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News Release



National Aeronautics and
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Washington, DC 20546
(202) 358-1600

For Release

Debbie Rahn
Headquarters, Washington, DC
(Phone: 202/358-1639)

May 8, 1995

Kyle Herring
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-63

MISSION AND PAYLOAD SPECIALISTS NAMED FOR LIFE, MICROGRAVITY FLIGHT

NASA has named mission and payload specialists for a 16-day flight aboard the Space Shuttle Columbia in the summer of 1996 to conduct life and microgravity science experiments.

Designated STS-78, the mission will have astronauts Susan J. Helms (Lt. Col, USAF), Dr. Richard M. Linnehan and Dr. Charles E. Brady, Jr. (Commander, USN), as the mission specialists. Also on the flight will be Dr. Jean-Jacques Favier, of the French Atomic Energy Commission (CEA) and astronaut of the French Space Agency (CNES), and Dr. Robert Brent Thirsk, of the Canadian Space Agency. Both will serve as payload specialists on the mission. Helms will serve as the flight engineer and Linnehan, Brady, Favier and Thirsk will serve as the payload crew. The commander and pilot will be named later.

NASA has designated Dr. Pedro Duque of the European Space Agency and Dr. Luca Urbani of the Italian Space Agency to serve as alternates to Favier and Thirsk. As alternates, Duque and Urbani will undergo the same training as Favier and Thirsk and will be ready to serve on the mission crew if necessary.

The mission's experiments will build on previous Shuttle spacelab flights dedicated to life sciences and microgravity investigations (Spacelab Life Sciences 1 and 2 -- STS-40 and STS-58, and International Microgravity Laboratory 1 and 2 -- STS-42 and STS-65).

Helms, 37, has flown two previous Shuttle missions, STS-54 in January 1993 and STS-64 in September 1994. She received a master of science degree in aeronautics/astronautics from Stanford University in 1985. Helms considers Portland, OR, her hometown.

- more -

- 2 -

Linnehan, 37, will be making his first flight. He is a member of the astronaut class of 1992. Linnehan earned his doctor of veterinary medicine degree from the Ohio State University College of Veterinary Medicine in 1985. He was born in Lowell, MA.

Brady, 43, also is a member of the astronaut class of 1992 and STS-78 will be his first flight. He received his doctorate in medicine from Duke University in 1975. He considers Robbins, NC, his hometown.

Favier, 46, earned a Ph.D. in engineering at the Mining School of Paris and a Ph.D. in metallurgy and physics from the University of Grenoble. He is advisor to the director of the CEA's Center for Materials Studies and Research. Detailed to CNES, Favier currently is working at NASA's Marshall Space Flight Center, Huntsville, AL, in the Payload Operations Laboratory and the Space Station Furnace Facility area. Favier was an alternate payload specialist for STS-65, the International Microgravity Laboratory-2 mission.

Thirsk, 41, earned a Doctor in Medicine from McGill University Medical School, Montreal, Canada and a Master of Science in mechanical engineering from the Massachusetts Institute of Technology. He is an adjunct professor of mechanical engineering at the University of Victoria and continues to practice clinical medicine in Canadian hospitals. Thirsk was an alternate payload specialist for the STS-41G mission.

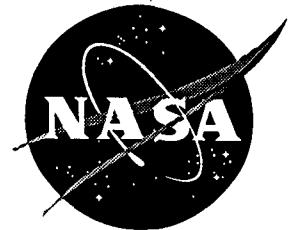
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Video Advisory

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 10, 1995

VIDEO ADVISORY: V95-63

UKRAINIAN SPACE WELDING TOOL ON NTV THURSDAY

The International Space Welding Experiment is a joint U.S./Ukrainian project that will assess the capabilities of the Ukrainian Universal Electron Beam Welding System as a repair tool for the international Space Station. Due for flight aboard Space Shuttle mission STS-87 in October of 1997, the welding tool will be tested for use as an aid to astronauts performing contingency or emergency repairs aboard the orbiting laboratory. An interview with experiment principal investigator Carolyn Russell will discuss the potential uses of the welding tool in space.

Following the welding experiment footage, NASA Television will re-air video and interviews of students who were recently announced as winners of NASA's 15th annual Space Science Student Involvement Program. Twenty-six national winners presented their projects at the National Space Symposium, held Monday and Tuesday of this week in Washington, DC. The national competition, co-sponsored by NASA and the National Science Teachers Association, is designed to promote science, mathematics and technology achievement. Over 4,000 students in elementary, junior and senior high school competed in five competition categories based on space themes.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>International Space Welding Experiment</i>	TRT: 2:32
ITEM #2: <i>Interview with Carolyn Russell on space applications of welding tool</i>	TRT: 1:57
ITEM #3: <i>Students explore space</i>	TRT: 4:00
ITEM #4: <i>Interview with student Ariel Overstreet</i>	TRT: 2:00
ITEM #5: <i>Interview with student Daniel Karlin</i>	TRT: 2:00
ITEM #6: <i>Interview with student Gregory Metcalf</i>	TRT: 2:00
ITEM #7: <i>Interview with student Jason Ernst</i>	TRT: 2:00
ITEM #8: <i>Interview with student Michelle Dedecker</i>	TRT: 3:00
ITEM #9: <i>Interview with student Sara Shelton</i>	TRT: 3:00
ITEM #10: <i>Interview with student Kathleen Cusick</i>	TRT: 2:00

All TRT's are approximate and subject to change.

Public Affairs Contacts

Ukrainian Space Welding Experiment
Student science competition

Mark Hess, 202/358-1778
Terri Hudkins, 202/358-1977

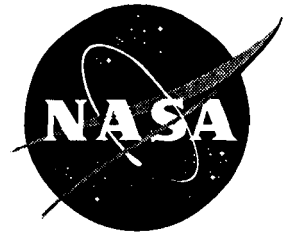
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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

May 10, 1995

RELEASE: 95-64

STUDENTS WIN NATIONAL AEROSPACE COMPETITIONS

Twenty-six students from schools across the U.S. have won national recognition in NASA's 15th annual Space Science Student Involvement Program (SSIP) competition. Students and their teachers were honored at the National Space Symposium, May 6-10, in Washington, DC.

Over 4,000 students in elementary, junior high and high school competed in five competition categories of the national competition. SSIP is co-sponsored by NASA and the National Science Teachers Association to promote science, mathematics and technology achievement.

During the Symposium, eight national semi-finalists in the Mars Scientific Experiment category competed for first place. The top national winner is Luke Bergmann, Montgomery Blair H.S., Silver Spring, MD.

In addition to their recognition in Washington, the students win the opportunity to intern at a NASA field center for a week during the summer. They also win a scholarship to Space Camp.

Competitions and Winners

Mars Science Expedition

Students in grades 9 to 12 planned and developed a trip to Mars and proposed an experiment to be conducted along the way. Students were required to follow the guidelines of the scientific method of research when designing the study. The following regional winners competed for first place during the Symposium:

- o Kathleen Cusick, Glastonbury H.S., Glastonbury, CT
- o Amita Danak, Parma Senior H.S., Parma, OH
- o Sara Shelton, Robinson Secondary School, Fairfax, VA
- o Brian Pierce, Bonnabel H.S., Metairie, LA
- o Travis Caddell, Springtown H.S., Springtown, TX
- o Michelle DeDecker, Davis H.S., Kaysville, UT

-more-

- o Bryn Daisy, East Anchorage H.S., Anchorage, Alaska
- o Luke Bergmann, Montgomery Blair H.S., Silver Spring, MD

Interplanetary Art Competition.

Students in grades 3 to 12 expressed their talents in science and art by creating a two-dimensional illustration depicting a scene from interplanetary space and writing an essay describing the picture. The art work will be displayed for public viewing.

- o Gregory Metcalf, Quail Summit Elementary School, Diamond Bar, CA
- o Jon Frey, Precious Blood Middle School, Dayton, OH
- o Jaime Behrens, Rosemount H.S., Rosemount, MN

Future Aircraft/Spacecraft Design Competition.

Students in grades 3 to 5 worked in teams to design a futuristic aircraft or spacecraft. The students created three illustrations and wrote an essay describing the spacecraft.

- o Ariel Overstreet, Jerick Graves, Megan Brewer, Daniel Karlin, Big Timber Grade School, Big Timber, MT

Mission To Planet Earth.

Students in grades 6 to 8, worked in three person teams to create an interdisciplinary project using satellites to study the effects of human activity on the Earth's ecosystem. They used research methods and an understanding of technology to search for solutions to society's ecological problems.

- o Laura Elliott, Angela Feuerborn, Stephanie Spiegel, Holy Trinity Elementary School, Paola, KS

Aerospace Internship Competitions.

Students in grades 9 to 12 competed for a one-week internship with their teacher/advisor at a NASA facility. Students were chosen on the basis of a written proposal of an experiment that could theoretically be performed at one of the facilities such as NASA's supercomputer, drop tube, wind tunnel, Space Station or Spacelab.

Supercomputer Internship

- o Raffi Krikorian, Clarkstown South H.S, West Nyack, NY, will intern at NASA Ames Research Center, Moffett Field, CA, with scientists and engineers working on the Cray Computer.

Space Station Internship

- o Rose Koba, Parma Senior H.S., Parma, OH, will intern at the NASA Johnson Space Center, Houston, with scientists and engineers working on the Space Station.

Wind Tunnel Internship

- o Jason Ernst, Montgomery Blair H.S., Silver Spring, MD, will intern at NASA Langley Research Center, Hampton, VA, with scientists and engineers conducting research in aerodynamics using wind tunnels.

Microgravity Internship

- o Nathan Hulse, Davis High School, Kaysville, UT, will intern at NASA Lewis Research Center, Cleveland, OH, with scientists performing microgravity experiments in a drop tube.

Spacelab Internship

- o Rachel Mandel, Montgomery Blair H.S., Silver Spring, MD, will intern at NASA's Marshall Space Flight Center, Huntsville, AL, conducting experiments with scientists and engineers in the pressurized Spacelab module.

Space Telerobotics Internship

- o Alex Epstein, Montgomery Blair H.S., Silver Spring, MD, will intern at NASA's Jet Propulsion Laboratory, Pasadena, CA, and work with engineers conducting research in the microrover laboratory for lunar and planetary surface exploration.

Space Astronomy

- o Brendan Connell, Montgomery Blair H.S., Silver Spring, MD, will intern at NASA's Goddard Space Flight Center, Greenbelt, MD, and work with astronomers conducting research in observational and theoretical astronomy and solar physics.

Launch Operations

- o Brian Blum, Shoreham-Wading River H.S., Shoreham, NY, will intern at NASA's Kennedy Space Center, FL, and work with engineers preparing payloads for their launch on the Space Shuttle.

-end-

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For Release

May 11, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-64

AIR TRAFFIC CONTROL FEATURED ON NTV FRIDAY

Friday's NASA TV video news file will open with a feature on how NASA technology is being used for traffic management at the new Denver Airport in Colorado. The airport is a test site for the Center TRACON Automation System (CTAS), which gives air traffic controllers all the information they need to get flights out of the airport on time and returned safely.

Following the air traffic control footage, NASA TV will show the Space Shuttle Discovery as it is rolled out to the launch pad at the Kennedy Space Center in Florida. Discovery's launch is targeted for June 8, 1995, and marks the 100th human space flight for the U.S. space program. The Discovery will take a five-member crew into orbit for the deployment of a NASA communications satellite.

Friday's feed also features researchers who will fly over Greenland and Canadian Islands Ellesmere and Baddin, in order to conduct ice mapping studies by gathering measurements of the ice sheets and glaciers. The measurements will help scientists better understand glacial changes that may be due to the global climate change.

As a part of NASA's long-term goal to promote science, mathematics, and various forms of technology as fields of study, NASA re-airs interviews with winners of the 15th annual Space Science Student Involvement Program. Twenty-six national winners presented their projects at the National Space Symposium, held Monday and Tuesday of this week in Washington, DC.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM # 1: <i>Air Traffic Control in Denver</i>	TRT: 3:47
ITEM # 2: <i>Interview with System Developer</i>	TRT: 3:45
ITEM # 3: <i>Greenland Ice Mapping</i>	TRT: 4:00
ITEM # 4: <i>Discovery Rolls Out for June Launch</i>	TRT: 4:00
ITEM # 5: <i>International Space Welding Experiment</i>	TRT: 4:45
ITEM # 6: <i>Interview with Carolyn Russell - Ukrainian Space Welding Tool</i>	TRT: 1:57
ITEM # 7: <i>Students Explore Space</i>	TRT: 4:45
ITEM # 8: <i>Award Winning Students</i>	TRT: 6:06
ITEM # 9: <i>Interview with student Ariel Overstreet</i>	TRT: 1:48
ITEM #10: <i>Interview with student Daniel Karlin</i>	TRT: :49
ITEM #11: <i>Interview with student Gregory Metcalf</i>	TRT: :42
ITEM #12: <i>Interview with student Jason Ernst</i>	TRT: 1:20
ITEM #13: <i>Interview with student Michelle Dedecker</i>	TRT: 1:58
ITEM #14: <i>Interview with student Sara Shelton</i>	TRT: 1:29
ITEM #15: <i>Interview with student Kathleen Cusick</i>	TRT: 1:34

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Public Affairs Contacts

Discovery preparations
Education Features

Bill Johnson, 407/867-7819
Terri Hudkins, 202/358-1977

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News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



Brian Dunbar
Headquarters, Washington, DC
(Phone: 202/358-1547)

For Release

May 11, 1995

Beth Schmid
Headquarters, Washington, DC
(Phone: 202/358-1600)

RELEASE: 95-65

NASA'S SWEEPING PROCUREMENT REFORMS AFFECT EOS BIDS

As part of its Agency reinvention initiative, NASA is unveiling several new procurement practices, including source selection reforms that will affect procurement of spacecraft for the Earth Observing System (EOS).

New practices in source selection are part of a reform package that touches all segments of the procurement process, from definition of requirements to contractor selection, award and program results.

"We want not the best written proposal, but the best business deal," said NASA Administrator Daniel S. Goldin.

"NASA expects total performance excellence from contractors," said Deidre A. Lee, NASA's Associate Administrator for Procurement. "That means excellence in the cost and schedule areas, as well as on the technical side."

The newest part of NASA's reform package will hold contractors to the costs they propose and will change the way NASA negotiates with offerors on contracts. To ensure total performance, NASA is focusing on selecting contractors whose proposals represent the best technical approach that is realistically, as well as efficiently, priced.

The first example of these new practices is the ongoing procurement of spacecraft for EOS. Letters have been sent to all four bidders notifying them that their cost estimates were unrealistically low. Each company will be given a chance to resubmit its bid under these guidelines:

- In its evaluations, the Source Evaluation Board will adjust the mission-suitability score for a proposal if the cost estimate is unrealistic.

- more -

- Rather than selecting one bidder and negotiating a final cost, as has been common on large contracts, NASA will negotiate in parallel a final cost with each offeror remaining in the competitive range. Those offerors will be asked to submit signed contracts with their "best and final offers." If, following this process, NASA is convinced that none of the offerors have demonstrated a realistic cost proposal, NASA is prepared to cancel the procurement and obtain support through alternate approaches.

- The selected contract will be the baseline by which NASA will judge the winning bidder's performance. If at any time it appears to NASA that the final cost will exceed the bid by more than 15 percent, the NASA Program Management Council will review the contract for possible termination.

"These source selection reforms epitomize NASA's firm commitment to improving business excellence," Lee said. "NASA's Office of Procurement has made significant changes in its procurement processes to emphasize the best business deal." The agency is better defining requirements, using performance-based contracting and addressing contract type and performance incentives, she added. NASA also has instituted a stronger award-fee policy and cost control changes.

Some contractors in recent years have proposed unrealistically low costs relative to their technical approach, expecting NASA to absorb increased costs that arise during the life of the contract, Lee said. Beginning with the EOS common spacecraft procurement, NASA's source selection process is being significantly changed to emphasize "best value"—that is the best, most affordable technical approach documented via contract.

Under this approach, if an offeror's proposed cost relative to its technical approach is unrealistically low, NASA will lower that company's technical score on its proposal. In effect this lowers the overall technical score, significantly lessening the offeror's competitiveness.

NASA will manage and expect contractor performance in accordance with that agreement. Contractors who do not perform will be reviewed for cancellation, and may also receive a negative past-performance evaluation when competing for other NASA work.

"We won't award a contract that is not realistic," said Lee. "We want everyone to understand NASA is serious about cost realism and cost control. It is vital that we have contracts that support and encourage performance excellence."

- end -

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NewsRelease

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

Sylvia Y. Purvis
Headquarters, Washington, DC
(Phone: 202/358-4727)

May 12, 1995

MEDIA ADVISORY

NASA TO SHOWCASE ACTIVITIES ON INFORMATION SUPERHIGHWAY

NASA will showcase its technology on the "information superhighway" as part of a public meeting of the Information Infrastructure Task Force from 9 a.m. to 4 p.m. EDT, May 18 and 19, in the lobby of the Department of Commerce building, 14th and Constitution Avenue, NW.

NASA staff and contractors will demonstrate and assist visitors to experience, first hand, projects funded by a Cooperative Agreement Notice establishing partnerships between government, private business and academia to promote the use of Earth and space science data over the Internet.

Visitors will be able to access information supporting public activities including K-12 education; life-long learning in museums, observatories and aquariums; emergency preparedness; land-use planning; resource management; state-of-the-art visualizations of weather phenomenon; study of volcanic activity; progressive image transmission and Internet connectivity over cable-TV lines.

The Task Force is charged with articulating and implementing the Clinton Administration's vision for a National Information Infrastructure.

-end-

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For Release

Michael Mewhinney
Ames Research Center, Mountain View, CA
(Phone: 415/604-9000)

May 12, 1995

RELEASE: 95-66

NASA TECHNOLOGY INCREASES EFFICIENCY AT NEW AIRPORT

Air traffic controllers at the new Denver International Airport are managing traffic more efficiently, thanks to an automation system developed at NASA's Ames Research Center.

Beginning in the late 1980s, an Ames team designed the Center-TRACON (Terminal RADAR CONTROL) Automation System (CTAS), which helps air traffic controllers optimize the flow of traffic into large airports.

"CTAS increases efficiency by providing better awareness of traffic flows through accurate assessment of the evolving traffic situation," said Heinz Erzberger, senior scientist for air traffic management at Ames. "It does not replace controllers, but rather 'thinks' along with them in solving traffic problems. One of its most powerful tools is a unique computer display for portraying expected build-up of delays at runways," he said.

"At the new Denver Airport, CTAS became the primary traffic management tool from the day the airport opened on Feb. 28. Components of the system are used at all three air traffic control facilities serving the airport, which are the Enroute Center, at Longmont, CO, the TRACON and the airport tower," Erzberger said.

Denver Airport officials say the airport's air traffic management system has been operating very smoothly and efficiently since the airport began operating with CTAS. In addition to Denver's new airport, the system also is being tested at the busy Dallas/Fort Worth airport.

"We're delighted to be a research and development site for CTAS," said Paul Davied, air traffic control supervisor at Denver International Airport's TRACON. "We have found the system to be a great asset to the traffic managers and the supervisors, as well as the controllers," he added. "CTAS enhances our ability to manage the flow of traffic in an efficient and effective manner."

The CTAS software contains a data base with the flight characteristics of most aircraft. In addition, the data base also has knowledge of winds, temperatures, arrival routes, runway configurations and landing capacity.

- more -

CTAS starts its work when traffic is about 45 minutes of flying time from the airport. As an aircraft approaches, CTAS scans its data base to select a preferred descent route based on the type of aircraft, weather conditions and various other factors. It finds the most favorable runway for the aircraft and the earliest available time for it to land.

CTAS is actually comprised of three interconnected components: a Traffic Management Advisor, a Descent Advisor and a Final Approach Spacing Tool. Only the Traffic Management Advisor, the simplest of the three components, has been put in operation at the Denver airport. The other two, which provide controllers with more complex information, are being prepared for testing at the Denver and Dallas/Fort Worth airports later this year.

"NASA's primary responsibility is to develop the technology and to prove its effectiveness at the two airports," Erzberger said. "That is a tremendous challenge. In effect, to do our job, we have to create a fully safety-qualified system for these airports," he said.

Future plans call for CTAS components to be installed at major hub airports throughout the U.S. If CTAS were to be implemented nationwide, Erzberger said, the airlines would save about a billion dollars per year, mostly from reductions in delay and fuel costs. These savings would ultimately benefit the passengers by lowering ticket prices and by providing better on-time performance.

"The Federal Aviation Administration is our primary customer for CTAS. From the beginning we have been working with the FAA and its contractors to ensure that the technology can be successfully adapted to all large airports in the U.S.," Erzberger said. "However, the complexity of the task of transferring the technology to our customer has surprised us. You have to develop a whole training infrastructure that will help the users get accustomed to the new way of thinking."

On the horizon for the beginning of the next century is a concept called "Free Flight," wherein ground and airborne systems communicate via satellite link. Under "Free Flight," airlines as well as general aviation users will be able to choose the best routes at all times. When this "Free Flight" traffic arrives in a congested terminal area, CTAS will kick in to smooth out the flow.

"Our work here at NASA, done cooperatively with FAA and the industry, is fostering a revolution in air traffic management," Erzberger said. "We are beginning to see the payoff in both safety and efficiency from the practical application of our design philosophy that combines the skill of the controllers and pilots with modern software and display technology."

-3-

"Our team at NASA is proud to have contributed to the smooth operation of the biggest and most important new airport to have been built in more than 20 years," Erzberger said. "In the airport's radar control room, large displays of CTAS are projected against the walls of the room so all controllers can easily see the information as they work in front of their radar monitors. Its unique installation gives CTAS a prominent place in the control room," Erzberger said.

- end -

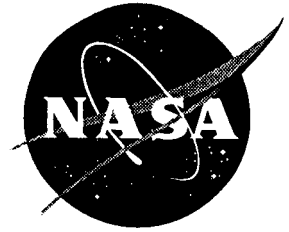
NOTE TO EDITORS: Photos are available to media representatives by calling NASA's Broadcast and Imaging Branch at 202/358-1900. NASA photo numbers are: Color - 95-HC-247, 95-HC-248; Black & White - 95-H-252, 95-H-253.

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Brian Dunbar
Headquarters, Washington, DC
(Phone: 202/358-1547)

May 12, 1995

Keith Koehler
Wallops Flight Facility, Wallops Island, VA
(Phone: 804/824-1579)

RELEASE: 95-67

NASA TO MEASURE NORTHERN ICE-SHEETS FOR CLIMATE STUDIES

NASA and university researchers will conduct ice mapping studies over Northeastern Canada and Greenland that they hope will yield valuable data on the potential effects of global climate change.

"The three-week campaign, which begins May 15, will provide an accurate set of measurements of the ice sheets and glaciers covering two islands in Canada and various areas of Greenland," said Bill Krabill, principal investigator from the NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, VA.

This will be the fifth mission since 1991 that NASA and university researchers have conducted measurements from aircraft and on the ground to provide data on the ice sheets.

The baseline measurements help scientists better understand glacial changes that may be due to global climate change, Krabill said. Some computer models show that increased global temperatures would partially melt polar ice sheets and raise sea levels. Other models show that rising temperatures would stimulate increased precipitation that would, in turn, increase the size of the ice sheets.

It has been estimated that a 10-inch (25-centimeter) decrease in the average height of the central Greenland ice sheet would result in a 0.04-inch (1-millimeter) increase in sea level of the world's oceans.

Recent ice elevation measurements taken from instruments on NASA aircraft were compared to surface measurements taken in 1980. This comparison showed that there has been a 6-foot (2-meter) increase in the ice elevation on the southwest slope of Greenland near the coast. However, other areas, such as the middle of the ice sheet, are stable.

- more -

During the May mission, researchers will fly over Greenland and Canada's Ellesmere Island and Baffin Island. Krabill said the Canadian sites were selected for mapping because minor ice caps may react more quickly to global climate changes than do larger ice caps like those in Greenland.

The researchers will use instruments aboard two planes, complemented by ground observations. A P-3B Orion aircraft from Wallops will use a laser-ranging system to measure the elevations of the glacier surface. The instrument, called the Airborne Topographic Mapper (ATM), will scan an area 459-feet (140-meters) wide immediately below the aircraft. The ATM measures the elevations of the glacial surface to within an accuracy of 4 inches (10 centimeters), Krabill said.

Other instruments on the aircraft will include a Wallops' profiling laser system and an ice-penetrating radar from the University of Kansas in Lawrence to measure ice thickness.

NASA's DC-8 will fly from Ames Research Center, Mountain View, CA, to Greenland to take part in the mission. The DC-8 will carry 29 mission scientists, instrument operators and crew members. Its primary payload will be an airborne radar built by NASA's Jet Propulsion Laboratory, Pasadena, CA. Radar measurements will be used to determine the topography of the Greenland ice sheet, and scientists will also attempt to measure the motions of the ice.

Researchers on the ice in Greenland will conduct ground studies beneath the flight path of the aircraft to verify the airborne data. The field team includes researchers from Ohio State University, Columbus, OH; the University of Arizona, Tucson, AZ; and the University of Nebraska, Lincoln, NE.

The ice mapping program is conducted under NASA's Office of Mission to Planet Earth, NASA Headquarters, Washington, DC. Mission to Planet Earth is a long-term, coordinated program to study how our global environment is changing. Using the unique perspective available from space, NASA is observing, monitoring and assessing large-scale environmental processes, with an emphasis on climate change.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Mark Hess
Headquarters, Washington, DC
(Phone: 202/358-1778)

May 15, 1995

Kari Fluegel
Johnson Space Center, Houston
(Phone: 713/483-5111)

NOTE TO EDITORS: N95-29

NEW MCC BRIEFING ADDED TO STS-70 PRE-FLIGHT SCHEDULE

A briefing introducing NASA's new Mission Control Center (MCC) will be conducted at 10 a.m. EDT on Tuesday, May 16 as part of the STS-70 Pre-flight Briefings at the Johnson Space Center.

For the first time since NASA's original Mission Control Center was established in 1965, flight controllers will be working out of the new facility for portions of the STS-70 Space Shuttle mission. The new MCC, developed at a cost of about \$250 million, eliminates the NASA-unique equipment and massive hardware orientation of the current Mission Control, replacing it with a modular, software-oriented design that uses standard, commercially available equipment.

The new MCC's design offers an unprecedented flexibility in flight control operations, allowing the facility to be changed from controlling a Space Shuttle to controlling any other spacecraft with almost the simplicity of choosing a different function from a computer menu. The commercially available equipment and up-to-date technology used in the new MCC will greatly reduce maintenance costs for the facility as well.

During STS-70, the ascent, Tracking and Data Relay Satellite deploy and entry operations will be conducted from the old Flight Control Room, but after the completion of the deploy, the flight control team will move to the new MCC for the remaining on-orbit operations.

The pre-flight briefings, which also will include discussions of the mission objectives, will originate from Johnson. Two-way question and answer capability will be available from all participating NASA Centers.

-more-

The updated briefing schedule is as follows: (all times are EDT)

May 16, 1995

- 10 a.m. New Mission Control Center Overview
 John Muratore, Chief, Control Center Systems Division
 Linda Uljon, Acting Chief, Control Center Systems Division
- 2 p.m. STS-70 Crew News Conference
 Terence "Tom" Henricks, Commander
 Kevin Kregel, Pilot
 Don Thomas, Mission Specialist 1
 Nancy Currie, Mission Specialist 2
 Mary Ellen Weber, Mission Specialist 3

NASA Television will carry all briefings live on Spacenet 2, Transponder 5, Channel 9 at 69 degrees West longitude. The transponder frequency is 3880 MHz and the audio subcarrier is 6.8 MHz. The polarization is horizontal.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

May 15, 1995

Keith Koehler
Wallops Flight Facility, Wallops Island, VA
(Phone: 804/824-2579)

RELEASE: 95-68

FIRST HIGH SCHOOL STUDENT PAYLOAD LAUNCHED BY NASA

A suborbital space payload, the first built and managed by junior and senior high school students, was successfully launched on a NASA sounding rocket at 5:00 p.m. EDT, Friday May 12, from NASA's Wallops Flight Facility, Wallops Island, VA.

The launch culminated a year-long aerospace course that took 79 Florida students in the 1993-94 school year through an academic program that taught them "hands-on" rocketry, including payload development, data analysis, flight electronics, flight dynamics, data transmission and optics.

The students are from Cocoa, Melbourne and Palm Bay High Schools and Southwest Junior High in Palm Bay, FL. Some students traveled to classes at Brevard Community College in Palm Bay.

The project is a cooperative venture between NASA, the State of Florida's Technological Research and Development Authority (TRDA) and the University of Central Florida (UCF). Harris Corp. and D.B.A. Systems, both of Melbourne, FL, provided facilities for vibration testing.

The rocket, a ten-foot tall Super Loki-Dart, went past the stratosphere to 45 miles (73 kilometers) altitude to transmit data back to Earth. Its mission is to prove the value of small, inexpensive meteorological rockets as tools in remote optical sensing.

-more-

"Using the Super-Loki Dart rocket vehicle will provide an inexpensive way to study pollution in the Earth's atmosphere," said Dr. Nebil Misconi of UCF, the project scientist.

According to Frank Schmidlin, the NASA principal investigator, there are two goals in this program. "The first is the invaluable education experience the students are receiving. Still important, but secondary, is the data, which is to obtain a set of astronomical observations to deduce total content of atmospheric aerosols."

"This program enriches the participants' technical education and gives them practical knowledge of the importance of the space program in studying the environment. The students are gaining an up-close and personal experience with a space mission," said Frank Kinney, Executive Director of the TRDA.

The TRDA funded the educational program with a \$50,000 grant in 1994. This was made possible through the Florida Department of Education and Challenger license plate sale funding, which support TRDA programs.

Wallops provided the rocket, final payload testing support, and launch range support, including data acquisition services.

- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

May 16, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-67

SPACE WALK FROM MIR SPACE STATION ON NASA TV WEDNESDAY

Television from the Russian Mir space station will provide NASA TV viewers with dramatic footage of a space walk downlinked from the Mir between 6:45 and 7:21 a.m. EDT on Wednesday. The space walk, performed by Mir Commander Vladimir Dezhurov and crew member Gennadiy Strekalov will be the second of at least four scheduled space walks to reconfigure Mir in preparation for docking with the Space Shuttle Atlantis. Atlantis is scheduled to dock with the Mir in late June during the STS-71 mission. During Wednesday's space walk footage commentary in English will be provided by NASA's Kyle Herring from Moscow Mission Control. The space walk video will be replayed as the first item on the daily video news file later in the day. American astronaut Norm Thagard has been aboard the Mir since March 14 as part of growing cooperation between NASA and the Russian Space Agency. Thagard is due to return aboard Atlantis as part of the historic STS-71 mission.

Following the space walk replay, the daily video news file will re-air a feature on the first suborbital space payload built and managed by junior and senior high school students, which was successfully launched on a NASA sounding rocket last Friday from NASA's Wallops Flight Facility, Wallops Island, VA. Closing out Wednesday's news file will be a replay of footage showing tests conducted by NASA on a new noise reduction jet nozzle. The nozzle, being designed as part of NASA's high speed civil transport program, will be discussed in an interview with aerospace engineer Brian Smith.

DOWNLINK OF SPACE WALK FROM MIR SPACE STATION - 6:47 - 7:21 A.M. EDT

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay of Mir crew space walk</i>	TRT: 30:00
ITEM #2: <i>Student rocket launch from Wallops Island, VA</i>	TRT: 12:00
ITEM #3: <i>Interview with Dr. Nebil Misconi, Ph.D. on student rocket project</i>	TRT: 3:00
ITEM #4: <i>Highlights of interview with rocket project students</i>	TRT: 3:00
ITEM #5: <i>NASA tests new noise reduction jet nozzle</i>	TRT: 6:00
ITEM #6: <i>Interview with aerospace engineer Brian Smith</i>	TRT: 3:00

All TRT's are approximate and subject to change.

Next live event from Mir: Friday at 10:05 a.m. EDT - Mission status report from Mir with American astronaut Norm Thagard discussing the week's events.

Public Affairs Contacts

Mir space walk
Student rocket project
Jet nozzle tests

Rob Navias, 713/483-5111
Terri Hudkins, 202/358-1977
Mike Mewhinney, 415/604-9000

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

May 16, 1995

Michael Mewhinney
Ames Research Center, Mountain View, CA
(Phone: 415/604-3937)

RELEASE: 95-69

NASA TESTS NEW NOISE REDUCTION JET EXHAUST NOZZLE

NASA's Ames Research Center, Mountain View, CA, is testing an advanced jet exhaust nozzle designed to reduce noise produced by a 21st century High Speed Civil Transport (HSCT) without adversely affecting the plane's takeoff performance.

The tests are part of NASA's High Speed Research Program, which is evaluating technologies needed for development of a 300-passenger supersonic transport that is both economically practical and environmentally acceptable.

"The commercial success of the next-generation HSCT depends upon its ability to satisfy mandated community noise regulations governing aircraft operations," said project manager Brian Smith, an Ames aerospace engineer.

As proposed, the HSCT would be capable of flying at Mach 2.4 (2.4 times the speed of sound) and have a range of 5,000 to 6,000 nautical miles. Envisioned to fly long distances over water, the HSCT could reduce the Los Angeles to Tokyo flight time from about 10 hours to only four. The expected date for beginning service is 2006.

The High-Lift Engine Aeroacoustics Technology (HEAT) tests are being conducted in Ames' 40-by-80-Foot Wind Tunnel in cooperation with Boeing Commercial Airplane Group, Seattle, WA; McDonnell Douglas Aerospace, Long Beach, CA; General Electric Aircraft Engines, Cincinnati, OH; and Pratt & Whitney, Hartford, CT. The 19 weeks of tests will continue through May 26.

"These tests will provide critical information needed to evaluate the suitability of ejector-type suppressor nozzles for the HSCT," said Michael Dudley, assistant manager of Ames' High Speed Research Office.

-more-

"There are three technical challenges to overcome in order to build a supersonic transport," Smith said. "The first is to make the HSCT quiet on takeoff and landing. We want the HSCT to be at least as quiet as a conventional subsonic jet transport."

The second challenge is to ensure that the sonic boom created during supersonic flight does not adversely affect people or wildlife. "As a result, when operating supersonically, the HSCT will probably only fly over water or land where the sonic boom is not detrimental to the environment," Smith said.

The last challenge has aerospace engineers studying how to reduce pollution produced by turbojet engines operating in the stratosphere. During the HEAT tests at Ames, engineers are concentrating on the first of these three challenges.

Working with NASA's Langley and Lewis Research Centers as well as the aerospace industry, project engineers are testing a mixer-ejector nozzle on a semi-span conceptual model of an HSCT. Developed by General Electric, the exhaust nozzle is designed to reduce the HSCT's noise during takeoff and landing without adversely affecting its performance.

The semi-span, 13.5 percent scale model is comprised of a wing and half-fuselage of a Boeing "Reference H" concept supersonic transport. The model will be wind tunnel tested at speeds of up to 300 knots (345 miles per hour).

"The Reference H model is the configuration being used for a variety of HSCT studies by the High Speed Research Program," Smith said. "It incorporates the latest aerodynamic features that Boeing brings to the table and is representative of current HSCT designs."

The 42-foot-long aircraft model is mounted on a four-foot high sound-absorbing platform called a splitter plate. The platform is insulated with ten inches of acoustic foam to absorb noise generated by a propane-powered jet engine simulator developed by Boeing and NASA.

A pair of microphones mounted on traversing struts beside the platform and four microphones suspended from the wind tunnel's ceiling enable engineers to measure jet noise at different speeds, flap configurations and angles of attack.

The mixer-ejector nozzle is mounted on the trailing edge of the model's semi-span wing. The nozzle has large air intakes which act like giant vacuum cleaners. During the wind tunnel tests, cool air flows over the model and through the nozzle's air intakes, where it mixes with hot air from the jet simulator.

"This cools the exhaust and reduces the velocity without affecting the thrust," Smith said. "The net effect is that we can maintain the same thrust while reducing the jet's velocity and hence the jet noise when the aircraft is taking off with 300 passengers," Smith said.

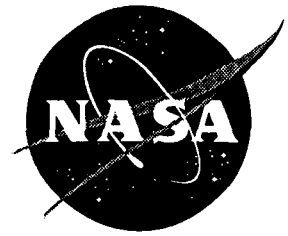
"HEAT is the first test to accurately measure the effects this nozzle has on the noise and performance of the aircraft," Smith said. "This is important from an environmental standpoint, because if the nozzle causes the aircraft to develop less lift, the only way to compensate is to take off at a higher angle," Smith said. "That requires more thrust and more thrust means more noise," he added.

"What we want is an efficient airplane that can take off at a low angle of attack with high ratios of lift to drag," Smith said. "Low drag means less thrust, and less thrust means less noise."

-end-

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NewsRelease



National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

May 16, 1995

RELEASE: 95-70

NASA AWARDS EDUCATION GRANTS TO MINORITY UNIVERSITIES

NASA today awarded eight minority universities three-year grants to develop teacher preparation and educational curriculum enhancement projects. Each university will receive up to \$600,000 over the three years.

The Mathematics, Science and Technology Awards for Teacher and Curriculum Enhancement Program (MASTAP) grants are intended to help prepare underrepresented mathematics, science and technology pre-service teachers to become state certified and to teach in middle and high schools that have substantial enrollments of underrepresented minority students.

The grant program targets institutions of higher education, especially Historically Black Colleges and Universities and Hispanic Serving Institutions that meet the eligibility criteria outlined in Public Law 102-325 in the higher education amendments of 1992, as well as Tribal Colleges and other minority universities whose student enrollment of underrepresented minorities exceeds 50 percent.

The universities selected to receive grants are:

- o Xavier University, New Orleans, LA
- o Bennett College, Greensboro, NC
- o Shaw University, Raleigh, NC
- o South Carolina State University, Orangeburg, SC
- o Medgar Evers College (CUNY), Brooklyn, NY
- o Humacao University College, Humacao, PR
- o University of Puerto Rico at Mayaguez, Mayaguez, PR
- o Florida International University, Miami, FL

The MASTAP grant program is sponsored by NASA's Office of Equal Opportunity Programs, Washington, DC.

- end -

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Launius, Roger

From: NASANews
To: press-release-nasa
Subject: NASA Zero-Base Review Briefing Scheduled
Date: Wednesday, May 17, 1995 2:02PM

Dwayne Brown
Headquarters, Washington, DC
(Phone: 202/358-1600)

May 17, 1995

NOTE TO EDITORS: N95-30

NASA ZERO-BASE REVIEW BRIEFING SCHEDULED

A briefing on NASA's Zero-Base Review will be held on Friday, May 19, at 11:30 a.m. EDT in the NASA Headquarters auditorium, 300 E St., SW, Washington, DC.

NASA Administrator Daniel S. Goldin will discuss the results and answer questions about the internal review team's proposals for management and organizational changes at NASA. The proposals will be assessed through the summer months and used to formulate the Agency's Fiscal Year 1997 budget submittal.

The briefing will be shown live on NASA Television with two-way question and answer capability from participating centers.

NASA Television is carried on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

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Video Advisory

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Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 17, 1995

VIDEO ADVISORY: V95-68

SATURN RING PLANE CROSSING ANIMATION ON NASA TV THURSDAY

On Thursday NASA Television will air animation and an interview examining Saturn plane rings in preparation for an astronomical event that will take place next Monday. On May 22 a phenomenon known as a Saturn ring plane crossing will take place for 24 minutes. At that time the rings around Saturn will be temporarily invisible when viewed from Earth, making faint objects near the planet easier for astronomers to see. The animation also will highlight the Cassini spacecraft, scheduled to study Saturn in 2004. Following the Saturn animation NASA TV will show preparations taking place for the Friday launch of a new weather satellite. The GOES-J satellite is the second of two weather watching satellites that will provide meteorologists with information about adverse weather patterns as they develop. A simulated countdown of the Atlas and Centaur vehicles in preparation for the launch will be shown. The simulation verifies the launch and readiness of all ground and airborne support systems.

Following the GOES-J video, NASA TV will replay footage of a space walk from the Mir space station. The space walk, performed by Mir Commander Vladimir Dezhurov and crew member Gennadiy Strekalov was the second of at least four scheduled space walks to reconfigure Mir in preparation for docking with the Space Shuttle Atlantis. Atlantis is scheduled to dock with the Mir in late June during the STS-71 mission. American astronaut Norm Thagard has been aboard the Mir since March 14 as part of growing cooperation between NASA and the Russian Space Agency. The video file also will re-air footage showing tests conducted by NASA on a new noise reduction jet nozzle. The nozzle, being designed as part of NASA's high speed civil transport program, will be discussed in an interview with aerospace engineer Brian Smith.

Video News File (transmission times: 12 p.m., 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Saturn ring plane crossing - animation and interview</i>	TRT: 1:13
ITEM #2: <i>Weather satellite preparation at the Kennedy Space Center, FL</i>	TRT: 2:42
ITEM #3: <i>Simulated countdown in preparation for Friday's launch</i>	TRT: 2:32
ITEM #4: <i>Replay of Mir crew space walk</i>	TRT: 26:20
ITEM #5: <i>NASA tests new noise reduction jet nozzle</i>	TRT: 2:22
ITEM #6: <i>Interview with aerospace engineer Brian Smith</i>	TRT: 3:18

All TRT's are approximate and subject to change.

Public Affairs Contacts

Saturn plane crossing
GOES-J Launch preparations
Mir space walk
Jet nozzle tests

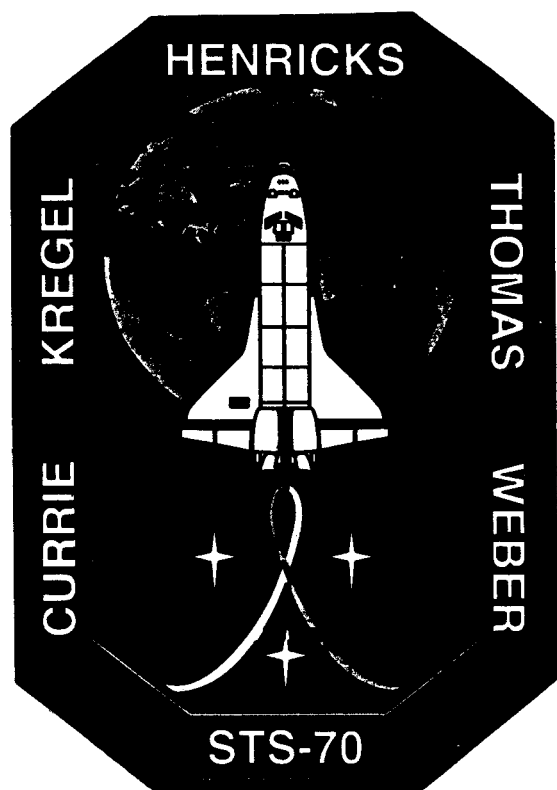
Doug Isbell, 202/358-1753
George Diller, 407/867-2468
Rob Navias, 713/483-5111
Mike Mewhinney, 415/604-9000

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-end-

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE MISSION STS-70



PRESS KIT JUNE 1995

America's 100th Human Spaceflight Mission

**Public Affairs Contacts
For Information on the Space Shuttle**

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Rob Navias Johnson Space Center Houston	Mission Operations Astronauts	713/483-5111
June Malone Marshall Space Flight Center Huntsville, AL	External Tank/SRBs/SSMEs	205/544-7061
Cam Martin Dryden Flight Research Center Edwards, CA	DFRC Landing Information	805/258-3448

For Information on STS-70 Experiments and Activities

Fred Brown Goddard Space Flight Center Greenbelt, MD	Tracking and Data Relay Satellite (TDRS)	301/286-7277
Jerry Berg Marshall Space Flight Center Huntsville, AL	Inertial Upper Stage (IUS)	205/544-0034
Michael Braukus Headquarters, Wash., DC	Biological Research in Canisters (BRIC) Bioreactor Development System (BDS) National Institutes of Health-R-2 (NIH R-2)	202/358-1979
Dave Hess DoD/Johnson Space Center Houston	Hand-Held, Earth-Oriented, Cooperative, Real-Time, User-Friendly, Location Targeting and Environmental System (HERCULES) Microencapsulation in Space-B (MIS-B) Midcourse Space Experiment (MSX) Military Application of Ship Tracks (MAST) Radiation Monitoring Equipment-III (RME-III) Space Tissue Loss-B (STL-B) Window Experiment (WINDEX) Visual Function Tester-4 (VFT-4)	713/483-3425
Jim Cast Headquarters, Wash., DC	Commercial Protein Crystal Growth	202/358-1779
Terri Hudkins Headquarters, Wash., DC	Shuttle Amateur Radio EXperiment (SAREX)	202/358-1977

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RELEASE: 95-71

DISCOVERY LAUNCH TO MARK 100TH HUMAN SPACEFLIGHT

Thirty-four years after Alan B. Shepard's historic 15-minute sub-orbital flight into space, America will launch its 100th human space mission on June 8 with the flight of the Space Shuttle Discovery.

Designated STS-70, the mission is scheduled to be launched into a 160-mile circular orbit during a two hour 30 minute window that opens at 9:01 a.m. EDT on June 8. The mission is scheduled for seven days, 22 hours and 10 minutes, but Shuttle officials may shorten the flight to five days depending on when the mission actually begins so that the next Shuttle mission - a historic linkup with the Russian space station Mir - can be launched about June 23. An eight-day mission would result in a June 16 landing at the Kennedy Space Center, FL. A shortened flight would see Discovery touch down on June 13.

Aboard Discovery will be a five-person crew commanded by two-time Shuttle pilot Terence "Tom" Henricks, pilot Kevin Kregel and mission specialists Donald Thomas (second flight), Nancy Currie (second flight) and Mary Ellen Weber. This will be Kregel and Weber's maiden space voyage.

Discovery's primary objective is the deployment of the Tracking and Data Relay Satellite-G, the last in a series of a space-based satellite network that provides communications, tracking, telemetry, data acquisition and command services essential to Shuttle and low-Earth orbital spacecraft missions.

Approximately six hours after launch, TDRS-G will be released out of Discovery's payload bay. It will be boosted to geostationary orbit 22,300 miles above the Earth by a powerful 2-stage, 16-ton solid-fueled Inertial Upper Stage, positioned at 171 degrees West longitude.

STS-70 will mark another significant milestone with the first flight of the new Block I Space Shuttle main engine. Main Engine #1 - engine 2036 - features improvements that increase the reliability and safety margins of the main engines. SSME's No. 2 and No. 3 are the current design.

The Block I engine features improvements such as a new liquid oxidizer turbopump produced through a casting process that eliminates all but six of the 300 welds that exist in the current pump. A new two-duct powerhead improves fluid flows within the engine to decrease pressure and loads. A new single-coil heat exchanger in the powerhead eliminates all seven weld joints inside the engine, reducing wear, maintenance and post-flight inspections. On STS-73, scheduled for launch in late September 1995, all three of the SSME's will be of the Block I design.

With TDRS successfully deployed, Discovery's crew will turn their attention to middeck experiments.

Among the payloads stowed in Discovery's middeck is the Commercial Protein Crystal Growth facility in which researchers will grow crystals of human alpha interferon protein, a protein pharmaceutical that is currently used against human viral hepatitis B and C. The objective is to use these crystals to determine the three-dimensional structure of molecules using crystallography to assist in the development of the next generation of alpha interferon drugs.

A University of Arizona researcher will examine the tobacco hornworm to determine how its hormone system and muscle formation are affected by zero-gravity in an experiment called Biological Research in Canisters-4. Basic information in hormone and muscle development will have a direct impact on basic research and development for long duration human space missions, as well as potentially affecting such areas as insect development and pest control on Earth.

BRIC-5, a State University of New York at Stony Brook experiment, will study the effects of spaceflight on the cell division of the daylily. This research will contribute to a better understanding of plant development and reproduction, which in turn will directly affect the ability to grow plants in space.

National Institutes of Health-sponsored experiments in the middeck will examine the effects of space flight on the behavior, muscle, nerve and bone development and circadian timing of rats. Much of this research is directed at developing a greater understanding of basic physiological processes which could provide insight into a range of medical challenges on Earth.

NASA and the Walter Reed Army Institute are collaborating on the space tissue loss-B experiment which will investigate the effects of microgravity on embryogenesis, using the Medaka fish egg as its biology model.

Also on board are a bevy of DoD-sponsored experiments including:

- Hand-Held, Earth-Oriented, Cooperative, Real-Time, User-Friendly, Location Targeting and Environmental System (HERCULES-B), a multispectral video camera-based geolocating system;
- Military Applications of Ship Tracks (MAST), which will take high resolution photographs of ship tracks to assist in an understanding of the effect of man-made aerosols on clouds and the resulting impact on the climate system;
- Microencapsulation in Space (MIS), which will look at a novel approach of encapsulating a drug in a biodegradable polymer so that as the polymer degrades the drug is released at a controlled rate;
- Midcourse Space Experiment (MSX), which will support the DoD's development of surveillance capabilities of ballistic missiles during the midcourse of their flight;

- Visual Function Tester (VFT), an instrument which could help explain why astronauts lose their ability to see clearly at close range when in space;
- Window Experiment (WINDEX), which will study the dynamics of thruster plumes, Shuttle glow, water dumps and flash evaporator system releases, atmospheric night glow and aurora to better understand the environment around low-Earth orbit satellites; and
- Radiation Monitoring Equipment (RME), prototype dosimeter instruments which measure exposure to ionizing radiation on the Shuttle.

Students in the U.S. and Argentina will speak to the astronauts via the Shuttle Amateur Radio Experiment. Among the schools scheduled to have an opportunity to talk to the astronauts are those in Troy and Euclid, OH; Farmingdale and Schenectady, NY; Concord, NH; Highland and Grand Rapids, MI; New Port Richey, FL, and Fallbrook, CA.

STS-70 will be the 21st flight of the Orbiter Discovery, and the 69th in the Space Shuttle program.

End of general release

MEDIA SERVICES INFORMATION

NASA Television Transmission

NASA Television is available through Spacenet-2 satellite system, transponder 5, channel 9, at 69 degrees West longitude, frequency 3880.0 MHz, audio 6.8 Megahertz.

The schedule for television transmissions from the Orbiter and for mission briefings will be available during the mission at Kennedy Space Center, FL; Marshall Space Flight Center, Huntsville, AL; Dryden Flight Research Center, Edwards, CA; Johnson Space Center, Houston; NASA Headquarters, Washington, DC. The television schedule will be updated to reflect changes dictated by mission operations.

Television schedules also may be obtained by calling COMSTOR 713/483-5817. COMSTOR is a computer data base service requiring the use of a telephone modem. A voice update of the television schedule is updated daily at noon Eastern time.

Status Reports

Status reports on countdown and mission progress, on-orbit activities and landing operations will be produced by the appropriate NASA newscenter.

Briefings

A mission press briefing schedule will be issued prior to launch. During the mission, status briefings by a Flight Director or Mission Operations representative and when appropriate, representatives from the payload team, will occur at least once per day. The updated NASA television schedule will indicate when mission briefings are planned.

Access by Internet

NASA press releases can be obtained automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service.

Informational materials also will be available from a data repository known as an anonymous FTP (File Transfer Protocol) server at [ftp.pao.hq.nasa.gov](ftp:pao.hq.nasa.gov) under the directory /pub/pao. Users should log on with the user name "anonymous" (no quotes), then enter their E-mail address as the password. Within the /pub/pao directory there will be a "readme.txt" file explaining the directory structure.

The NASA public affairs homepage also is available via the Internet. The page contains images, sound and text (press releases, press kits, fact sheets) to explain NASA activities. It also has links to many other NASA pages. The URL is:
http://www.nasa.gov/hqpao/hqpao_home.html

Pre-launch status reports from KSC are found under **ftp.hq.nasa.gov/pub/pao/statrpt/ksc**, and mission status reports can be found under **ftp.hq.nasa.gov/pub/pao/statrpt/jsc**. Daily TV schedules can be found under **ftp.hq.nasa.gov/pub/pao/statrpt/jsc/tvsked**.

Access by fax

An additional service known as fax-on-demand will enable users to access NASA informational materials from their fax machines. Users calling (202) 358-3976 may follow a series of prompts and will automatically be faxed the most recent Headquarters news releases they request.

Access by CompuServe

Users with CompuServe accounts can access NASA press releases by typing "GO NASA" (no quotes) and making a selection from the categories offered.

STS-70 QUICK LOOK

Launch Date/Site:	June 8, 1995/KSC Pad 39B
Launch Time:	09:01 a.m. EDT
Launch Window:	2 hours, 30 minutes
Orbiter:	Discovery (OV-103) - 21st flight
Orbit/Inclination:	160 nautical miles/28.45 degrees
Mission Duration:	7 days, 22 hours, 10 minutes
Landing Date:	June 16, 1995
Landing Time:	8:30 a.m. EDT
Primary Landing Site:	Kennedy Space Center, FL
Abort Landing Sites:	Return to Launch Site - KSC Transoceanic Abort Landing - Banjul, The Gambia Ben Guerir, Morocco Moron, Spain Abort Once Around - Edwards Air Force Base, CA
Crew:	Tom Henricks, Commander (CDR) Kevin Kregel, Pilot (PLT) Don Thomas, Mission Specialist 1 (MS 1) Nancy Currie, Mission Specialist 2 (MS 2) Mary Ellen Weber, Mission Specialist 3 (MS 3)
Cargo Bay Payloads:	Tracking and Data Relay Satellite/Inertial Upper Stage
Middeck Payloads:	Biological Research in Canisters (BRIC) Bioreactor Development Systems (BDS) Commercial Protein Crystal Growth (CPCG) National Institutes of Health-R-2 (NIH R-2) Space Tissue Loss-B (STL-B) Midcourse Space Experiment (MSX)
In-Cabin Payloads:	Hand-Held, Earth-Oriented, Cooperative, Real-Time, User-Friendly, Location Targeting and Environmental System (HERCULES) Microencapsulation in Space-B (MIS-B) Military Application of Ship Tracks (MAST) Radiation Monitoring Equipment-III (RME-III) Shuttle Amateur Radio Experiment (SAREX) Window Experiment (WINDEX) Visual Function Tester-4 (VFT-4)

DEVELOPMENT TEST OBJECTIVE/DETAILED SUPPLEMENTARY OBJECTIVES

DTO 301D:	Ascent Structural Capability Evaluation
DTO 305D:	Ascent Compartment Venting Evaluation
DTO 306D:	Descent Compartment Venting Evaluation
DTO 307D:	Entry Structural Capability Evaluation
DTO 312:	External Tank Thermal Protection System Performance
DTO 319D:	Shuttle/Payload Low Frequency Environment
DTO 414:	APU Shutdown Test
DTO 524:	Landing Gear Loads and Brake Stability Evaluation
DTO 656:	PGSC Single Event Upset Monitoring
DTO 677:	Evaluation of Microbial Capture Device, Microgravity
DTO 779:	STS Orbiter Attitude Control Translational Thrusting
DTO 805:	Crosswind Landing Performance
DSO 491:	Characterization of Microbial Transfer Among Crewmembers
DSO 603:	Orthostatic Function During Entry, Landing and Egress
DSO 621:	In Flight Use of Florinef to Improve Orthostatic Intolerance
DSO 624:	Pre and Postflight Measurement of Cardiorespiratory Responses to Submaximal Exercise
DSO 626:	Cardiovascular and Cerebrovascular Responses to Standing Before and After Space Flight
DSO 802:	Educational Video
DSO 901:	Documentary Television
DSO 902:	Documentary Motion Picture Television
DSO 903:	Documentary Still Photography
DSO 904:	Assessment of Human Factors

SPACE SHUTTLE ABORT MODES

The Space Shuttle launch abort philosophy aims toward safe and intact recovery of the flight crew, Orbiter and its payload. Abort modes for STS-70 include:

- * Abort-To-Orbit (ATO) -- Partial loss of main engine thrust late enough to permit reaching a minimal 105-nautical mile orbit with the orbital maneuvering system engines.
- * Abort-Once-Around (AOA) -- Earlier main engine shutdown with the capability to allow one orbit of the Earth before landing at the Edwards Air Force Base, CA.
- * TransAtlantic Abort Landing (TAL) -- Loss of one or more main engines midway through powered flight would force a landing at either Banjul, The Gambia; Ben Guerir, Morocco; or Moron, Spain.
- * Return-To-Launch-Site (RTL) -- Early shutdown of one or more engines, and without enough energy to reach a TAL site, would result in a pitch around and thrust back toward KSC until within gliding distance of the Shuttle Landing Facility.

STS-70 SUMMARY TIMELINE

Flight Day One:

Launch
Orbital Maneuvering System-2 & 3 Burn
Secondary Payload Activation
TDRS-G/IUS Deploy
IUS Ignition

Flight Day Eight:

Visual Function Tester Operations
Flight Control System Checkout
Reaction Control System Hot-Fire
Crew News Conference
Cabin Stow

Flight Day Two:

OMS 4 Burn
Visual Function Tester Setup
CPCG Activation
SAREX Setup
HERCULES Setup
WINDEX Setup
Bioreactor Demonstration System Operations

Flight Day Nine:

Deorbit Prep
Deorbit Burn
Landing

Flight Day Three:

HERCULES Operations
Visual Function Tester Operations
Bioreactor Demonstration System Operations
WINDEX Operations
SAREX Operations

Flight Day Four:

Bioreactor Demonstration System Operations
WINDEX Operations
SAREX Operations
HERCULES Operations

Flight Day Five:

Visual Function Tester Operations
WINDEX Operations
Bioreactor Demonstration System Operations
AMOS Reaction Control System Tests
SAREX Operations

Flight Day Six:

WINDEX Operations
HERCULES Operations
Bioreactor Demonstration System Operations

Flight Day Seven:

Visual Function Tester Operations
HERCULES Operations
Bioreactor Demonstration System Operations
WINDEX Operations

PAYLOAD AND VEHICLE WEIGHTS

<u>Vehicle / Payload</u>	<u>Pounds</u>
Orbiter (Discovery) empty and 3 SSMEs	173,885
Tracking and Data Relay Satellite-G Deployable	4,905
Interial Upper Stage - Deployable	32,868
TDRS-G - Airborne Support Equipment	5,586
BDS	155
BRIC	30
CPCG	116
HERCULES	161
MIS	120
NIH-R-2	133
SAREX	27
STL	68
DTOs/DSOs	5
Shuttle System at SRB Ignition	4,522,790
Orbiter Weight at Landing	195,195

STS-70 ORBITAL EVENTS SUMMARY

EVENT	MET
Launch	0/00:00
OMS-2	0/00:42
TDRS-G/IUS Deploy	0/06:12
Sep-1 Burn	0/06:13
Sep-2 Burn	0/06:27
IUS Injection Burn	0/07:12
OMS-4 Circ Burn	1/03:45
Deorbit Burn	7:21:08
KSC Landing	7:22:10

STS-70 CREW RESPONSIBILITIES

Primary Payload

TDRS-G/IUS

Thomas, Weber

Secondary Payloads

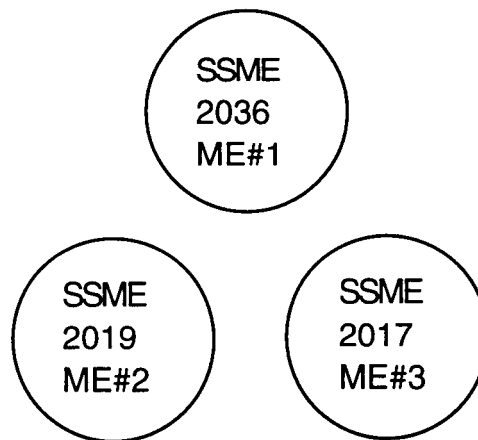
WINDEX		Henricks, Kregel, Currie
STL		Currie, Weber
RME		Kregel, Currie
NIH-R (PARE)		Thomas, Currie
MIS-B		Thomas, Weber
HERCULES		Henricks, Kregel, Currie
CPCG		Currie, Weber
BRIC		Kregel, Currie
BDS		Weber, Thomas
SAREX		Thomas, Currie
VFT		Weber, Henricks
DTO 656	(PGSC)	Thomas, Weber
DTO 779	(Orbiter Control)	Henricks, Kregel
DSO 677	(Microgravity)	Currie
DSO 904	(Human Factors)	All
DSO 621	(Orthostatic)	Thomas
DSO 603C	(Landing Ortho)	Thomas
DSO 624	(Cardiovascular)	All

BLOCK 1 SPACE SHUTTLE MAIN ENGINE

STS-70 will be the first flight for an upgraded version of a Space Shuttle Main Engine (SSME). On this flight, one engine will be of a new configuration known as Block 1, while the remaining two engines will be of the current SSME design.

The first flight planned to use three Block 1 engines is STS-73, currently targeted for late September 1995.

The Block 1 configuration will greatly increase engine performance, reliability and safety. Together the three SSMEs produce the almost 1.5 million pounds of thrust which assist in carrying the Shuttle system into orbit.



Engine configuration for STS-70
SSME 2036 is the first Block 1 engine to fly on the Shuttle.

One enhancement to the Block 1 engine is the new high pressure liquid oxidizer turbopump built by Pratt & Whitney. The pump housing in the new design is produced through a unique casting process, eliminating all but six of the 300 welds that exist in the current pump. This increases the safety margins and reliability of the main engines. The new turbopumps will not require a detailed inspection until they have flown 10 times. The high pressure liquid oxygen pumps used in the current SSME must be removed after every flight for inspection.

Flight certification for the turbopumps, which provide the oxidizer to the engine, was completed in March 1995. The new pumps underwent a test program equivalent to 40 Space Shuttle flights, a milestone in the final certification of the pumps for flight.

The improved pump design also incorporates new ball bearings of silicon nitride. The ceramic bearings are 30 percent harder and 40 percent lighter than steel and have an ultra-smooth finish, thus producing less friction during pump operation.

Another enhancement to the Block 1 engine is the new two-duct powerhead. The powerhead contains the preburners that generate the gas to drive the turbopump turbines. It collects the hot gases of the turbines downstream and ducts them into the main injector. By replacing the three smaller fuel ducts in the current design with two enlarged ducts, the new design significantly improves fluid flows within the engine. Pressure and loads are decreased, turbulence is reduced, maintenance is eliminated and inspections are minimized. The two-duct powerhead is constructed with fewer welds, thus eliminating potential weak spots.

The powerhead also has a single-coil heat exchanger, replacing the current two-coil design. The heat exchanger provides pressure to the Shuttle's external tank, enabling it to provide propellants to the engines. The new configuration eliminates all seven weld joints inside the engine. Constructed of a continuous piece of stainless steel alloy, this reduces wear on the tube and lessens the chance of damage. Maintenance and post-flight inspections also are reduced.

The SSME project is managed by Marshall Space Flight Center. Pratt and Whitney, West Palm Beach, FL, developed and manufactured the new pump. Rocketdyne, Canoga Park, CA, will integrate the pump into the main engine.

TRACKING AND DATA RELAY SATELLITE SYSTEM

History

The Tracking and Data Relay Satellite System (TDRSS) is a space-based network that provides communications, tracking, telemetry, data acquisition and command services essential to Shuttle and low-Earth orbital spacecraft missions.

The TDRSS was initiated following studies in the early 1970s which showed that a system of telecommunications satellites, operated from a single ground station, could meet the needs of NASA's mission better and more cost-effectively than the then existing network of tracking and communications ground stations located around the world.

The TDRSS has delivered on the promise, enabling NASA to cut telecommunications costs while increasing data acquisition and communications contact time with spacecraft six-fold. TDRSS can provide communications services to orbital spacecraft over 85 percent of each orbit for most satellites, and continuous service for some orbital positions.

In addition to the Shuttle, TDRSS customers include the Compton Gamma Ray Observatory (GRO), Upper Atmosphere Research Satellite, Hubble Space Telescope, Earth Radiation Budget Satellite, Extreme Ultraviolet Explorer, TOPEX-POSEIDON, and other non-NASA missions. Among future TDRSS-dependent missions are the international Space Station and the Earth Observation System. NASA estimates the value of the space missions which will have relied on the TDRSS through the end of this decade is in the tens of billions.

The TDRSS consists of two major elements: A constellation of geosynchronous satellites and a ground terminal complex located at White Sands, New Mexico. The original ground terminal, Cacique, is currently undergoing rehabilitation. When Cacique is returned to service in 1996, it will be a virtual twin of the new Danzante terminal, which became fully operational in March and is providing all operational services. Together, these two terminals will eliminate a critical single point of failure and provide the capacity to use partially failed Tracking and Data Relay Satellite (TDRS) spacecraft to meet NASA's communications needs in the future.

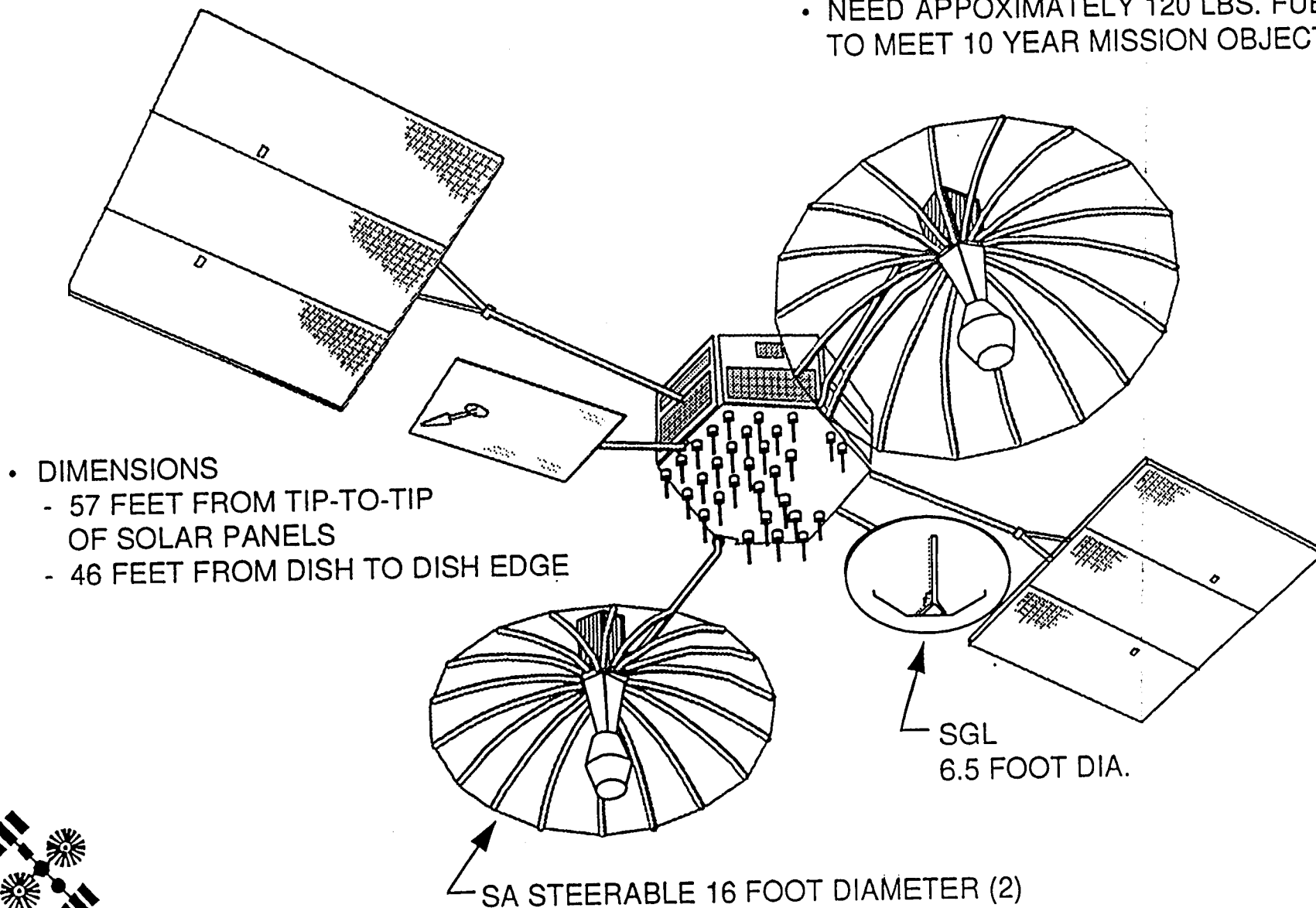
Current Status

NASA's latest Tracking and Data Relay Satellite, TDRS-G, is scheduled for launch on board Discovery. TDRS-G is the seventh and final in the first series of communications spacecraft that make up the TDRSS. Although TDRS-G will be stored on orbit and not used immediately, it is being launched now to take advantage of the experienced crew for the critical launch and deployment sequence. In addition, on-orbit storage is less costly than ground storage and extended crew retention.

After Discovery achieves orbit, the TDRS-G spacecraft and its attached Inertial Upper Stage (IUS) will be deployed from the Shuttle cargo bay. The IUS consists of two Solid Rocket Motors (SRM's) which will inject the TDRS/IUS into geostationary orbit. The IUS SRM-1 will first place the TDRS/IUS into a transfer orbit with an apogee near geosynchronous altitude. At the first apogee the IUS SRM-2 will fire to

TDRS - 7

- IUS TARGET WEIGHT 4,905 LBS.
 - FUEL ADJUSTED AS NEEDED
 - DRY WEIGHT 3,802 LBS.
(INCLUDING 269 LBS ADAPTER)
- NEED APPROXIMATELY 120 LBS. FUEL TO MEET 10 YEAR MISSION OBJECTIVE



place the TDRS/IUS in geostationary orbit. The TDRS/IUS will be maneuvered to the appropriate orientation and TDRS-G will separate from the IUS.

Once it is on orbit, the TDRS-G designation will be changed to TDRS-7. Following the spacecraft bus checkout and the On-Orbit Test Phase, TDRS-7 will be ready to provide service.

TDRS-1 was launched in April 1983, on board Space Shuttle Challenger, and the second TDRS was lost in the Challenger accident in January 1986. TDRS-3 was launched on board Space Shuttle Discovery in September 1988, and TDRS-4 was launched on board Discovery in March 1989. TDRS-5 was launched on board Space Shuttle Atlantis in August 1991. TDRS-6 was launched on board Space Shuttle Endeavour in January 1993.

The five orbiting TDRS spacecraft are all functioning, but only three (TDRS-4, TDRS-5, and TDRS-6) are fully operational. Because of the flexible capability of the TDRSS, following the successful launch and checkout of TDRS-G, the TDRSS constellation will be reconfigured.

TDRS-1 is presently positioned at 275 degrees West longitude and is operated from New Mexico via the remote TDRSS ground terminal located in the Deep Space Network Complex in Canberra, Australia. TDRS-1 is used primarily to provide service to the Compton GRO, which has a failed tape recorder. Although TDRS-1 sustained significant damage during its launch in 1983, resulting from a failure of the launch vehicle upper stage, this spacecraft has provided excellent service for many years and continues to serve in a limited capacity well beyond its planned seven year lifetime.

Present plans call for TDRS-3 to replace TDRS-1 at 275 degrees West longitude, southeast of Sri Lanka, to continue support to GRO as well as provide added support for the STS/MIR rendezvous activities, and potential support to Space Station. TDRS-1 will be repositioned to 139 degrees West longitude and may be used to support science investigations in the South Pole region. TDRS-5 at 174 degrees West longitude, southwest of Hawaii, and TDRS-4 at 41 degrees West longitude, East of Brazil, are designated as the prime operational spacecraft and provide the bulk of the support to NASA TDRS customers. TDRS-6, now located at 46 degrees West longitude, has its user support payload turned off to preserve lifetime and serves as an on-orbit reserve spacecraft. After TDRS-G is deployed in geostationary orbit and successfully checked out, it will be positioned at 171 degrees West longitude.

The successful launch and checkout of TDRS-G will give NASA the essential requirement of having two fully operational satellites and two fully operational "ready reserve" satellites. Because of NASA's critical dependence on TDRSS, at least one fully-functional spacecraft must be available in reserve to replace a failed operational spacecraft. This will assure that NASA communications, telemetry and data acquisition capabilities required by space missions will not be jeopardized.

TDRS-G is the last of a generation of seven spacecraft, built by TRW of Redondo Beach, CA, that make up the initial series of communication satellites for NASA. Future system needs will be supported by the TDRS-H, I, J spacecraft, the next series of satellites, whose initial launch is planned for 1999.

TDRS Spacecraft Launch and Operational Status

Spacecraft	Mission	Status
TDRS-1	STS-6 April 5, 1983	Partially operational
TDRS-2	51-L January 1986	Lost in the Challenger Accident
TDRS-3	STS-26 September 29, 1988	Partially operational
TDRS-4	STS-29 March 13, 1989	Fully operational
TDRS-5	STS-43 August 2, 1991	Fully operational
TDRS-6	STS-54 January 13, 1993	Fully operational

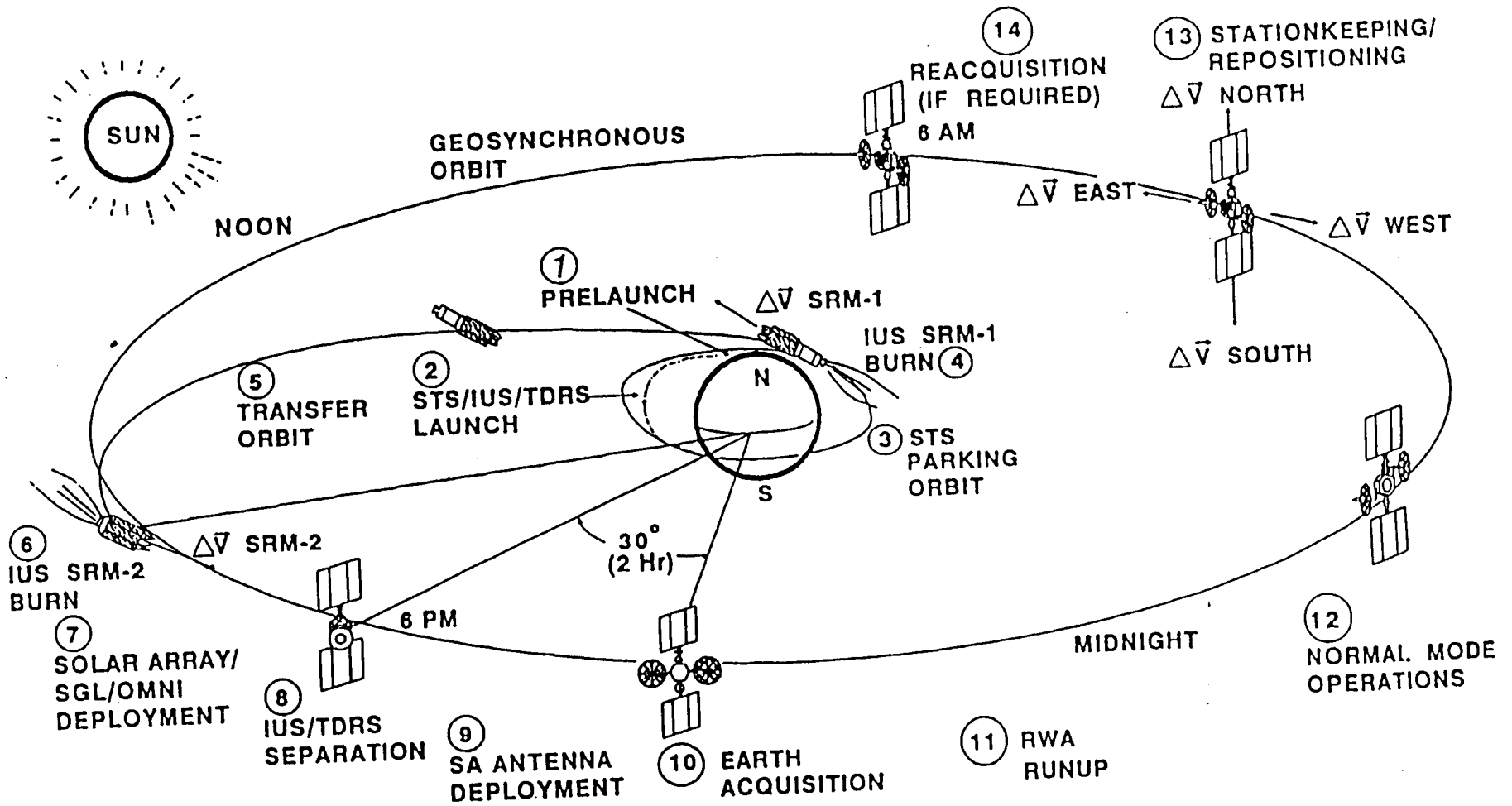
Current Position

TDRS-1	275 degrees West
TDRS-3	62 degrees West
TDRS-4	41 degrees West (over the Atlantic Ocean off Brazil)
TDRS-5	174 degrees West (East of Gilbert Islands and South of Hawaii)
TDRS-6	46 degrees West

Reconfigured Position after TDRS-G (7) Checkout

TDRS-1	139 degrees East
TDRS-3	275 degrees West
TDRS-4	44 degrees West
TDRS-5	174 degrees West
TDRS-6	46 degrees West
TDRS-7	171 degrees West

MISSION PROFILE



NUMBERS INDICATE EVENT SEQUENCE

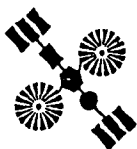
B02



TDRS CONSTELLATION STATUS

	LAUNCHED	GEOSYNCHRONOUS ORBIT	IN-ORBIT CHECKOUT COMPLETE	UTILIZATION
TDRS-1	APRIL 4, 1983 STS-6 (CHALLENGER)	JUNE 29, 1983	<ul style="list-style-type: none"> - DECEMBER 28, 1983 - ONE SATELLITE SYSTEM ACCEPTANCE APRIL 1985 	<ul style="list-style-type: none"> - CURRENTLY ON ROUTE TO 138° W. (WILL SUPPORT NSF SCIENCE MISSIONS)
TDRS-3	SEPTEMBER 29, 1988 STS-26 (DISCOVERY)	SEPTEMBER 30, 1988	<ul style="list-style-type: none"> - JANUARY 15, 1989 - TWO SATELLITE SYSTEM ACCEPTANCE JULY 1989 	<ul style="list-style-type: none"> - CURRENTLY AT 85° E. & BEING USED FOR STS AND GRO SUPPORT
TDRS-4	MARCH 13, 1989 STS-29 (DISCOVERY)	MARCH 14, 1989	JUNE 9, 1989	<ul style="list-style-type: none"> - CURRENTLY DESIGNATED AS TDRS EAST AT 41° W. & PROVIDING USER SUPPORT
TDRS-5	AUGUST 2, 1991 STS-43 (ATLANTIS)	AUGUST 3, 1991	OCTOBER 7, 1991	<ul style="list-style-type: none"> - CURRENTLY DESIGNATED AS TDRS WEST AT 174° W. & PROVIDING USER SUPPORT
TDRS-6	JANUARY 13, 1993 STS-54 (ENDEAVOUR)	JANUARY 14, 1993	MARCH 4, 1993	<ul style="list-style-type: none"> - CURRENTLY AT 46° W. - AVAILABLE AS ON-LOCATION BACKUP FOR TDRS-E
TDRS-7	JUNE 8, 1995 STS-70	JUNE 9, 1995	AUGUST, 1995	<ul style="list-style-type: none"> - TO BE LOCATED AT 171° W., DESIGNATED TDRS-SPARE, WILL BE A SCHEDULABLE SPARE, ACTIVELY USED FOR STS-SUPPORT

TDRS-2 LOST JANUARY 28, 1986 ABOARD STS-51L (CHALLENGER)



Deployment Sequence

TDRS-G will be deployed from Discovery approximately six hours after launch on orbit five (over the Pacific north of Hawaii). Injection burn to geostationary orbit will be initiated at 77 degrees East longitude (Indian Ocean, south of India), placing the satellite in orbit at 178 degrees West longitude (over the Pacific near the Gilbert Islands).

The STS-70 crew elevates the IUS/TDRS to 29 degrees in the payload bay for preliminary tests and then raises it to 58 degrees for deployment. A spring-loaded ejection system is used for deploying the IUS/TDRS.

The first burn of the IUS booster will take place one hour after deployment, or about seven hours after launch. The second and final burn (to circularize the orbit) will take place five and one half hours after the first burn, approximately 12 1/2 hours into the mission. Separation of the booster and satellite will occur at 13 hours after launch.

Upon reaching geostationary orbit, the deployment of appendages and antennas is started. The deployment sequence is:

1. Deploy solar arrays.
2. Deploy Space-to-Ground Link (STGL) boom.
3. Deploy Solar Sail boom.
4. Separation of IUS and TDRS.
5. Release Single Access (SA) booms.
6. Position SA antennas.
7. Open SA antennas.

During steps five, six and seven, Earth acquisition is taking place concurrently.

The TDRS is three-axis stabilized with the Multiple Access (MA) fixed antennas pointing constantly at the Earth while the solar arrays track the Sun.

Communication System

The TDRS' do not process customer traffic. Rather, they operate as "bent pipe" repeaters, relaying signals and data between the user spacecraft and the ground terminal and vice versa without processing.

Nominally, the TDRSS is intended to meet the requirements of up to 24-customer spacecraft, including the Space Shuttle, simultaneously. It provides two types of service: (1) MA which can relay data from as many as 20 low data rate (100 bits per second to 50 kilobits per second) customer satellites simultaneously and (2) single access antennas which provide two high data rate channels (300 megabits per second) from both the East and West locations.

The White Sands Complex (WSC), provides a location with a clear line-of-sight to the TDRS' and a place where rain conditions have limited interference with the availability of the Ku-band uplink and downlink channels. The WSC is operated for

NASA by Allied Signal Technical Services Corporation; Columbia, MD, and GTE Government Systems Corp., Needham Heights, MA.

Other associated facilities located at the Goddard Space Flight Center (GSFC) include: the Network Control Center, which provides the primary interface with customer satellites to schedule service and act as the focal point for NASA user communications with the WSC; the Flight Dynamics Facility, which provides antenna pointing information for user spacecraft and the TDRS; and, the NASA Communications (NASCOM) Network, a global system which provides operational communications support to all NASA projects.

NASCOM offers voice and data links with the Space Network, the Ground Networks, and the user spacecraft control centers and data processing facilities. For TDRSS, NASCOM provides a common carrier interface through Earth terminals to link GSFC, White Sands, and the Johnson Space Center in Houston.

NASA's Office of Space Communications, Washington, DC, has overall management responsibility of these tracking, data acquisition and communications facilities.

TDRS Components

The TDRS' are composed of three distinct modules: An equipment module, a communications payload module and an antenna module. The modular design reduces the cost of individual design and construction efforts that, in turn, lower the cost of each satellite.

The equipment module housing the subsystems that operate the satellite is located in the lower hexagon portion of the main body of the spacecraft. The attitude control subsystem stabilizes the satellite to provide accurate antenna pointing and proper orientation of the solar panels to the Sun. The electrical power subsystems consist of two solar panels that provide a ten-year power supply of approximately 1,700 watts. The thermal control subsystem consists of surface coatings and controlled electric heaters.

The payload module, located on the upper hexagon portion of the main body of the spacecraft, is composed of the electronic equipment required to provide communications between the user spacecraft and the ground. The receivers and transmitters for single access services are mounted in compartments on the back of the SA antennas.

The antenna module is composed of five antenna systems: two SA, the MA arrays, STGL, and the S-band omni for satellite health and housekeeping.

For SA service, each TDRS has two dual-feed S-band, Ku-band parabolic (umbrella-like) antennas. These antennas are free to be positioned in two axes, directing the radio beam to orbiting user spacecraft below. These antennas are used primarily to relay communications to and from user spacecraft. The high data rate provided by these antennas is available to users on a time-shared basis. Each antenna is capable of supporting two-user spacecraft services simultaneously--one at

S-band and one at Ku-band--provided both users are within the beam width of the antenna.

The MA antenna array, consisting of 30 elements, is hard-mounted on the spacecraft body on the surface of the antenna module facing the Earth.

Another antenna, a 6.5-foot (2-meter) parabolic reflector, provides the prime link for relaying transmissions to and from the ground terminal at Ku-band.

THE INERTIAL UPPER STAGE (IUS)

The Inertial Upper Stage (IUS) will be used on Space Shuttle mission STS-70 to boost NASA's TDRS-G Tracking and Data Relay Satellite from low-Earth orbit to geosynchronous orbit, some 22,300 statute miles (35,000 kilometers) from Earth.

Background

The IUS was originally designed as a temporary stand-in for a reusable space tug. The IUS was then named the Interim Upper Stage. The word "Inertial" (signifying the guidance technique) later replaced "Interim" when it was observed that the IUS would be needed through the 1990s.

The IUS was developed and built by the Boeing Aerospace Co., Seattle, WA, under contract to the Air Force Material Command's Space and Missile Systems Center. The Space and Missile Systems Center is executive agent for all Department of Defense activities pertaining to the Space Shuttle system and provides the IUS to NASA for Space Shuttle use. For NASA missions, the IUS program is managed by the Marshall Space Flight Center, Huntsville, AL.

NASA's most recent use of an IUS was on the STS-54 mission of the Space Shuttle (launched Jan. 13, 1993), which successfully transported the TDRS-F satellite to geosynchronous orbit. It also has boosted the Galileo probe on a journey to explore Jupiter, the Magellan spacecraft to Venus, and the Ulysses toward a polar orbit of the Sun.

Specifications

The IUS is a two-stage, solid rocket propelled, three-axis stabilized vehicle for placing spacecraft in a high-Earth orbit or on an escape trajectory for an interplanetary mission.

The IUS is 17 feet (5.18 meters) long and 9.25 feet (2.8 meters) in diameter, with an overall weight of approximately 32,500 pounds (14,742 kilograms). The IUS consists of a first stage comprised of a large solid rocket motor containing 21,400 pounds (9,707 kilograms) of propellant and generating approximately 42,000 pounds (188,496 newtons) of thrust and an interstage. The second stage consists of a solid rocket motor with 6,000 pounds (2,722 kilograms) of propellant generating approximately 18,000 pounds (80,784 newtons) of thrust, and an equipment support section.

The large solid rocket motor is the longest thrusting duration solid rocket motor ever developed for space application, with the capability to fire for as long as 150 seconds. Mission requirements determine the thrust level and burn duration of the solid rocket motors. These factors are controlled by tailoring the solid propellant load.

The equipment support section houses the avionics systems of the IUS. These systems provide guidance, navigation, control, telemetry, command and data management, reaction control and electrical power. All mission-critical components of the avionics system, along with thrust vector actuators, reaction control thrusters, motor igniter and pyrotechnic stage separation equipment are redundant to assure reliability of better than 98 percent.

The IUS employs Airborne Support Equipment for installation in the Space Shuttle as well as operation and deployment from the orbiter. The Airborne Support Equipment consists of mechanical, avionics, and structural equipment located in the orbiter. The Airborne Support Equipment structurally attaches the IUS and the payload to the orbiter payload bay, provides interface for the IUS and payload checkout and elevates the IUS/payload for deployment from the Orbiter.

The TDRS spacecraft is attached to the IUS at eight attachment points provided on the forward surface of the forward ring of the Equipment Support Section. The eight-point attachment provides substantial load-carrying capability while minimizing the transfer of heat across the connecting points. Power, command and data transmission between the two are provided by several IUS interface connectors.

In addition, the IUS provides an insulation blanket of multiple layered, double-aluminized Kapton and polyester net spacers across the IUS/TDRS interface. The outer layer of the blanket, facing the TDRS spacecraft, is a special Teflon-coated fabric called Beta cloth. The blankets are vented toward and into the IUS cavity, which in turn is vented to the orbiter payload bay. There is no gas flow between the spacecraft and the IUS. The thermal blankets are grounded to the IUS structure to prevent electrostatic charge buildup.

Flight Sequence

After the orbiter payload bay doors are opened in orbit, the orbiter will maintain a preselected attitude to keep the payload within thermal requirements and constraints.

On-orbit predeployment checkout begins, followed by an IUS command link check and spacecraft communications command check. Orbiter trim maneuvers normally are performed at this time.

Forward payload restraints will be released and the aft frame of the airborne support equipment will tilt the IUS/TDRS to an angle of 29 degrees from the payload bay. This will extend the TDRS into space just outside the orbiter payload bay, allowing direct communication with Earth during systems checkout. The orbiter will then be maneuvered to the deployment attitude. If a problem has developed at this point within the orbiter, the TDRS spacecraft or the IUS, the IUS and spacecraft can be restowed and potentially recycled for additional deployment attempts.

Prior to deployment, the spacecraft electrical power source will be switched from orbiter power to IUS internal power by the orbiter flight crew. After verifying that the spacecraft is on IUS internal power and that all IUS/TDRS predeployment operations have been successfully completed, a "go/no-go" decision for IUS/TDRS deployment will be sent to the crew.

When the orbiter flight crew is given a "go" decision, they will activate the pyrotechnic devices that disconnect the IUS/TDRS umbilical cables. The crew will then command the electromechanical tilt actuator to raise the tilt table to a 58-degree deployment position.

During deployment, the orbiter's thrusters will be inhibited and a pyrotechnic separation device initiated to physically separate the IUS/TDRS spacecraft combination from the tilt table and orbiter. Compressed springs provide the force to push the IUS/TDRS from the orbiter payload bay at approximately 4.2 inches (0.10 meters) per second. The deployment is normally performed in the shadow of the orbiter or in Earth eclipse.

The tilt table will be lowered to minus six degrees after IUS and its spacecraft are deployed. Approximately 19 minutes after IUS/TDRS deployment, the orbiter's engines will be ignited to move the orbiter away from the IUS/TDRS.

At this point, the IUS/TDRS is controlled by the IUS onboard computers. Approximately 10 minutes after the IUS/TDRS is deployed from the orbiter, the IUS onboard computer will send out signals used by the IUS and/or TDRS to begin mission sequence events.

The IUS will maneuver to the required thermal attitude and perform any required spacecraft thermal control maneuvers.

At approximately 45 minutes after deployment from the orbiter, the pyrotechnic inhibitors for the solid rocket motor will be removed. The belly of the orbiter has been oriented towards the IUS/TDRS combination to protect the orbiter windows from the IUS's plume.

When the proper transfer orbit opportunity is reached, the IUS computer will send the signal to ignite the first-stage motor. This is expected at approximately 60 minutes after deployment (L+7 hours, 13 minutes). After firing approximately 146 seconds and prior to reaching the apogee point of its trajectory, the IUS first stage will expend its fuel. While coasting, the IUS will perform any maneuvers needed by TDRS for thermal protection or communications. When this is completed, the IUS first stage and interstage will be separated from the IUS second stage.

Approximately six hours, 12 minutes after deployment (L+12:30), the second-stage motor will be ignited, thrusting for about 108 seconds. After second-stage burn is completed, the IUS stabilizes the TDRS while the solar arrays and two antennas are deployed. Once the TDRS has completed its deployment activities, the IUS second stage will be separated and then perform a final collision/contamination avoidance maneuver before deactivating.

BIOLOGICAL RESEARCH IN CANISTERS (BRIC-4 / BRIC-5)

Research on plant growth and development, as well as research on the hormone system of insects, is an important part of the scientific mission of STS-70. Biological Research in Canisters (BRIC) experiments, designed to examine the effects of microgravity on a wide range of physiological processes in plants, insects, and small invertebrate animals, are part of the Small Payloads Program. Research in the "quick turn around" (on average one year or less) BRIC program has provided basic scientific information on a range of important topics, from plant metabolism affecting food crops to information on the processes of insect development and pest control.

Previous BRIC experiments have focused on starch metabolism in plant seedlings (BRIC-1 & 3), on development in plant tissue culture (BRIC-2), and on ways that hormones affect the development of gypsy moths from worm-like juveniles to winged adults (BRIC-1). BRIC payloads are flown in canisters located in lockers on the Shuttle's middeck. These canisters are simple carriers for small biological payloads and afford the investigator the opportunity to expose their samples to a microgravity environment for extended periods of time.

BRIC-4

Dr. Marc E. Tischler of the University of Arizona College of Medicine will examine the tobacco hornworm to determine how its hormone system and muscle formation processes are affected by an altered gravitational field. In his study entitled "Effects of Microgravity on Tobacco Hornworm During Metamorphosis", Dr. Tischler will examine the hormone system of the tobacco hornworm (*Manduca sexta*).

Previous studies on the juvenile tobacco hornworm showed alterations in chemical building blocks (amino acids), rate of adult development and flight muscle size as a result of exposure to microgravity. All of these parameters are dependent on the levels of the hormone Ecdysone. In normally-developing tobacco hornworms, Ecdysone release occurs near the outset of adult development. Ground studies indicate that altered orientation of the developing insect within the first 96 hours produces significant changes. Dr. Tischler's study also will examine the synthesis of protein necessary to form muscle in the developing tobacco hornworm during flight.

Spaceflight has been shown to affect the hormone systems of humans, animals and insects, as well as increasing muscle degeneration of crew members. This study will examine a biological specimen whose hormone system and muscle formation appear to be sensitive to an altered gravitational field. This will add to the knowledge base of gravitational biology and the space life sciences by shedding light on the interactive role of gravity on a variety of biological mechanisms. Basic information in hormone and muscle development will have a direct impact on basic research and development for long duration human space flight, as well as potentially affecting such areas as insect development and pest control on Earth.

In addition, there has been a science-educational outreach effort associated with the study of insect development. College undergraduates, high school students and elementary schools throughout the Tucson, AZ, area are involved in a *Manduca* outreach project. This outreach program began three years ago with a single

elementary school which was provided with young caterpillars, and artificial diet and instructions on maintaining the insects. To date, hundreds of students in the Tucson area have studied the tobacco hornworm in the classroom. This outreach project has proven to be a strong bridge between the University and its local public schools and has served to get elementary students excited about science and the space program.

BRIC-5

In the experiment, "Plant Embryos and Fidelity of Cell Division in Space", Dr. Abraham D. Krikorian of the State University of New York at Stony Brook, will test whether the cell division changes observed in the daylily (*Hemerocallis cultivar*. Autumn Blaze) are the result of the direct effects of microgravity or indirect effects such as water availability.

This research is important because human exploration of space depends on our ability to grow plants in microgravity. Long duration space missions require a large supply of food and water. It will not be possible to store the necessary volume or mass of food required for extended space missions. As a result, it is critical that food production systems be developed for use in flight. Current efforts in a range of biotechnologies are dependent on the ability to use and manipulate these systems in space.

To develop these food production systems, which are dependent on individual plants, plant cells must be able to grow normally. Dividing and developing plant cells need to process and pass on accurate genetic information to new plants. The extent to which such growth and development will occur in microgravity is a key concern for modern plant biotechnologies in space.

Preliminary results from the Plant Cell Research experiment aboard STS-47 and Proembryogenesis in Space experiment aboard STS-65 have shown genetic abnormalities occur to plants during space flight. Mechanisms of information transfer or signaling through various parts of the cell do not occur normally in space. Because ground based studies indicate that water related activity can impact the integrity of chromosomes, it is possible that the results observed in STS-47 and STS-65 are not due to the direct effect upon the plants but on the indirect effects mediated by water availability to the plant cells.

This experiment will use daylily cells as a model system to test the impact of the changes in water availability and activity on plant reproduction. Plant development entails an orderly progression of cellular events both in terms of time and space. Previous studies have demonstrated that microgravity has adverse effects on plant cell function. Work from Cosmos 782 and 1129 indicated that while the broad events of plant development proceeded in space, the progression was slowed and there were fewer later stages generated in the plant population.

One of the major indirect effects of microgravity on plant development may be on water. In microgravity water does not go to the bottom of a container; it floats, is affected by air currents and stays on the sides of containers. This affects the availability of water for plant growth and development. Changes in water relations in

microgravity affect moisture availability, surface tension, buoyancy driven convection, gas diffusion and stratification.

This research will contribute to our understanding of plant development and reproduction, which in turn, will directly affect our ability to grow plants in space. The research also will support a better understanding of the basic processes of plant genetics in general, which may provide benefits here on Earth, particularly in arid environments.

BIOREACTOR DEVELOPMENT SYSTEM (BDS)

Just as gravity affects the manner in which crystals grow and materials are processed, Earth's pull also can alter the development of cells and tissues. Microgravity, however, can provide life science researchers with the opportunity to grow cells into three-dimensional tissue pieces that are not achievable using conventional tissue culture methods on Earth.

The Bioreactor Demonstration System is designed to use ground-based and space-bioreactor systems to grow individual cells into organized tissue that is morphologically and functionally similar to the original tissue or organ.

The BDS is composed of a device developed at the Johnson Space Center that uses a rotating cylinder to suspend cells and tissues in a growth medium, simulating some aspects of microgravity. The system, which is already being used extensively in ground-based research, also provides for gas and nutrient exchange.

The purpose of the flight experiment is to demonstrate the performance of the bioreactor in actual microgravity. As such, the primary goal is to assess the fluid dynamic characteristics of the bioreactor in microgravity.

This includes not only the motion of various sizes of small particles in the bioreactor under different conditions, but also the ability of the bioreactor to provide the environment and metabolic support required to grow and maintain mammalian cell cultures in microgravity.

The experiment protocol uses colon cancer cells as a test of the bioreactor performance. At specified times during the flight, the STS-70 crew members will inject color producing substances to document fluid movement in the reactor, and various-sized beads to estimate the tissue size that could be supported in the bioreactor. Crew members also will perform off-line measurements of pH, glucose and carbon dioxide content within the bioreactor and will record the results of the system's performance.

Investigators anticipate the fluid dynamics analysis will show sufficient mixing to support tissue growth with minimal cell damage. They also hope the system will allow the colon cancer cells to metabolize glucose, producing acid, thereby demonstrating the function of the pH sensor. BDS also will demonstrate the bioreactor's ability to provide oxygen and glucose and remove waste products.

The BDS Team consists of Stanley J. Kleis, Ph.D., engineering principal investigator; J. Milburn Jessup, M.D., cell science principal investigator; Richard Saur, mission manager; and Neal R. Pellis, Ph.D., program director.

NATIONAL INSTITUTES OF HEALTH-R-2

Space Flight Effects on Mammalian Development

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This project emphasizes features of the rat's behavior and physiology that are known to contribute to successful pregnancy, labor, delivery and the onset of postnatal care - especially lactation. Lacking the challenge of working against gravity and disruption of specific behaviors, such as self-grooming, may compromise the female's ability to give birth and provide sufficient milk. Development of vestibular (balance) function in all species begins well before birth. The use of pregnant animals exposed to microgravity will eliminate the effects of gravity from direct input during the development of this system. Examination of the behavior of the offspring after birth is expected to provide information about the earliest development of the vestibular system under gravity as compared to microgravity circumstances.

Neuromuscular Development and Regulation of Myosin Expression

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The purpose of this experiment is to determine whether gravity is required prior to birth for the normal development of muscles. Prior to birth, muscle cells migrate to the limbs and form specific muscles which become innervated by axons whose cell bodies are in the spinal cord. The muscle fibers within the muscle go through a series of changes until they reach their adult state. This process of muscle specialization is initiated prior to birth and continues through the first month after birth. This study will determine whether exposure to microgravity during embryonic development affects the normal development of muscles and nerves by examining the innervation of muscles by nerves, the morphological development of muscles and the differentiation of muscle fibers into adult types. These experiments will provide valuable information regarding how muscles develop.

Effect of Space flight on the Development of the Circadian Timing System

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Development of the neurologic system, particularly the retina and its connections in the brain, and the circadian timing system, the internal "clock" which regulates sleep-wake cycles and other daily physiologic functions, begins well before birth. The circadian timing system is an important temporal organizer controlling both the physiology and behavior of organisms. For example, conditions such as jet-lag, shift-work and some sleep and mental disorders are frequently associated with dysfunction of the circadian timing system. The exposure of developing rat offspring to microgravity may lead to alterations in these systems, which may increase our fundamental understanding of the development and operation of these systems.

Effect of Microgravity on Bone Development

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Under conditions of weightlessness, humans and experimental animals show loss of bone mass accompanied by excretion of calcium in urine. The development of skeletal bone also may be affected by exposure to microgravity *in utero* (before birth). If so, different enzymes and proteins (tissue plasminogen activator, plasmin, collagenase, etc.) important for bone development may appear at altered times and at altered levels. The present study will investigate the expression of these enzymes in fetal and postnatal rats exposed to microgravity *in utero*. Such findings would shed light on the importance and role of gravity in developing skeletal bone. The information gained may help in the therapeutic intervention of bone diseases on Earth, such as osteoporosis.

Histological Effects of Microgravity on Rat Body Wall Musculature

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Postural muscles in the hind limbs of rodents deteriorate dramatically (i.e., decondition) under extended periods of weightlessness. The muscles of the body wall of rodents and other quadrupeds are themselves postural muscles that help elevate the abdomen and flex the spine during locomotion. Additionally, these muscles are extremely important in a variety of visceral functions that require large increases in abdominal pressure (e.g., coughing, defecation, parturition, etc.). If these muscles deteriorate, as do hind limb postural muscles, then this may severely compromise the ability of animals to give normal vaginal birth as a result of being exposed to

microgravity. Greater understanding of the basic physiological processes involved in this research could provide insight into a range of medical challenges from diseases involving severe muscle degeneration, to helping accident victims who are immobilized with bedrest for extended periods of time, to developing countermeasures for severe muscle degeneration.

COMMERCIAL PROTEIN CRYSTAL GROWTH

The Commercial Protein Crystal Growth (CPCG) experiment aboard STS-70 is sponsored by the Center for Macromolecular Crystallography (CMC) based at the University of Alabama at Birmingham. The CMC is one of 11 NASA Centers for the Commercial Development of Space and forms a bridge between NASA and private industry by developing methods for the crystallization of macromolecules in microgravity. These crystals are used to determine the three-dimensional structure of the molecules by x-ray crystallography. The structural information not only provides a greater understanding of the functions of macromolecules in living organisms, but it also provides scientific insight into the development of new drugs.

By the technique of protein crystallography, crystals of purified proteins are grown in the laboratory and x-ray diffraction data are collected on these crystals. The three-dimensional structure is then determined by analysis of these data. Unfortunately, crystals grown in the gravity environment of Earth frequently have internal defects that make such analysis difficult or impossible. Space-grown crystals often have fewer defects and are much better than their Earth-grown counterparts.

The protein crystal growth experiment on STS-70 will consist of the Protein Crystallization Facility (PCF). The objective of the PCF experiment, contained in a thermal control enclosure located in Discovery's middeck, will be to crystallize human alpha interferon protein. Alpha interferon is a protein pharmaceutical that currently is used against human viral hepatitis B and C. The objective is to discover the next generation alpha interferon pharmaceuticals and formulations.

For the eight PCF flights to date, seven yielded larger space-grown crystals and five yielded crystals of superior x-ray quality. Two yielded crystals, though larger than their Earth-grown counterparts, that were too small for x-ray analysis; thus, their x-ray diffraction quality could not be assessed. On the SPACEHAB 1 and 2 missions with the PCF, the CMC grew crystals of human insulin of exceptional quality. These crystals provided the pharmaceutical industry with the most detailed picture ever seen for this important protein, the key medication for diabetes. Industry will now use this structural information to develop a novel and improved time-release insulin formulation.

With continued research, the commercial applications developed using protein crystal growth have phenomenal potential, and the number of proteins that need study exceeds tens of thousands. Current research, with the aid of pharmaceutical companies, may lead to a whole new generation of drugs which could help treat diseases such as cancer, rheumatoid arthritis, periodontic disease, influenza, septic shock, emphysema, aging and AIDS.

A number of pharmaceutical companies partner with the CMC, including:

- BioCryst Pharmaceuticals, Inc.

- Eli Lilly and Co.
- Schering-Plough
- DuPont Merck Pharmaceuticals
- Eastman Kodak
- Upjohn Co.
- Smith Kline Beecham Pharmaceuticals
- Vertex Pharmaceuticals, Inc.

Principal Investigator for the STS-70 Commercial Protein Crystal Growth experiment is Dr. Larry DeLucas, Director of the CMC.

SPACE TISSUE LOSS - B (STL-B)

The STL-B experiment is a collaborative research project between Walter Reed Army Institute of Research, Washington, DC, and the NASA Life & Microgravity Sciences and Applications Div., Washington DC. The researchers: Dr. Debra Wolgemuth, Columbia Univ.; Dr Carey Phillips, Bowdoin College; and Dr William Wiesmann, WRAIR, are investigating the effects of microgravity on embryogenesis. Their analysis is centered on the evaluation of a very well described and understood biology model, the Medaka fish egg. The study focuses on evaluating the micro-gravity effect at the molecular level. Of particular interest is the digital image capture of the "gastrulation" development phase via the STL-B on board video microscope and telemetry to the investigators on the ground. This follow-up experiment will help validate previous STS-59 findings as well as provide additional definition to the model for future space biology experimentation.

STL-B is a DOD payload and is being flown under the direction of the DOD Space Test Program.

HAND-HELD, EARTH-ORIENTED, COOPERATIVE, REAL-TIME, USER-FRIENDLY, LOCATION TARGETING, AND ENVIRONMENTAL SYSTEM (HERCULES)

HERCULES-B is the third generation of a space-based geolocating system. For this configuration, a XYBION multispectral video camera has been integrated with the HERCULES geolocation hardware. The second generation, HERCULES-A, used NASA's Electronic Still Camera (ESC) and was flown twice (STS-53 and 56). HERCULES-B will allow the system to respond to requirements that exploit multispectral techniques.

The geolocation part of the system, built by the Naval Research Laboratory, calculates and tags every frame of video with latitude and longitude with an accuracy of three nautical miles. The multispectral video camera is a high resolution (38 line pairs/mm) XYBION IMC-301 image intensifying camera. The XYBION was integrated by the Night Vision and Electronic Sensors Directorate. This camera will allow multispectral imagery @ 15 meter Ground Sampling Distance (GSD) from the Shuttle in the 500-900 nanometer spectral region. The camera uses filter wheels that rotate in the optical path at 300 rpm. Several filter wheels (each with six filters), suggested by the Environmental Research Institute of Michigan and the Office of Naval Research, will be provided to the crew to be changed during the mission. The camera also has a 'panchromatic mode' that allows high shutter speed imagery to be

obtained. In this mode, the high shutter speeds (<100 microseconds) will allow the effects of Orbiter and operator motion to be decreased. With the longest focal length lens (1800 mm), GSDs of three meters are anticipated based on laboratory and field measurements. Various focal length lenses (320-1830 mm) will be used in panchromatic mode which will allow a wide variety of fields of view and GSDs.

This system will be used to locate a wide variety of features on the ground.

HERCULES is a DOD payload and is being flown under the direction of the DOD Space Test Program.

MICROENCAPSULATION IN SPACE - B (MIS-B)

Microencapsulation in Space (MIS) makes its second space flight aboard the Space Shuttle Discovery. The purpose of this project, developed at Southern Research Institute and sponsored by the U.S. Army Dental Research Detachment, Walter Reed Army Institute of Research, is to produce a novel pharmaceutical (microencapsulated antibiotic) in weightless conditions using equipment that has been improved since the first MIS flight in 1992 (STS-53).

The same experiment will be conducted using newly designed equipment which should improve the yield of the microspheres. In the experiment, the drug (ampicillin) is entrapped within a biodegradable polymer, so that as the polymer degrades in the body, the drug is released at a controlled rate. In the 1992 Space Shuttle experiment, the microcapsules were perfectly shaped, more homogeneous, and free of residual solvents, thus purer than those made in gravity, but the yield was small.

Microencapsulated antibiotics, which are capable of providing precise and predictable sustained drug release rates, control wound infections more effectively than systemically administered antibiotics and do so in vivo after a single application to infected wounds. The microencapsulated formulations provide high antibiotic concentrations in the wound site over a prolonged period of time, during which the polymeric carrier biodegrades into carbon dioxide in water. The end result is that all microorganisms in the wound are killed by the antibiotic, and the drug carrier (polymer) dissolves in the body leaving no residue.

According to Dr. Thomas Tice of Southern Research Institute, who is principal investigator, "The space environment should result in a greater versatility for microencapsulation methodologies, thereby allowing a more successful use of procedures presently used on Earth. Some pharmaceuticals that have failed to encapsulate on Earth should successfully encapsulate in space."

Dr. Jean Setterstrom, an Army scientist who has worked closely with Southern Research on microencapsulated antibiotics for over 15 years, stated that the Army has supported this project because they recognize the potential of microencapsulation technology in targeting drugs in newer, more powerful ways to get enhanced pharmaceutical efficacy with fewer adverse effects in vivo. This offers dramatically improved treatment modalities for deployed soldiers ranging from better therapeutic drugs to prophylactic vaccines.

MIDCOURSE SPACE EXPERIMENT (MSX)

MSX is a Department of Defense program sponsored by the Ballistic Missile Defense Office, designed to support the development of surveillance capabilities of ballistic missiles during the midcourse of their flight. The principal instrument of the program is a satellite in a 99 degree inclination, 898 kilometer altitude polar orbit. The imaging and spectrographic sensors carried by the MSX satellite cover a broad range of spectral regions from the far ultraviolet to the long wave infrared. The MSX Shuttle experiments are flown under the direction of the Defense Department's Space Test Program and involve using the MSX satellite to observe the plumes from Shuttle engine burns and the Shuttle body, representative of a resident space object (RSO), against Earth and space backgrounds.

STS-70 will be the first Shuttle mission involving the MSX program. This mission occurs during the MSX satellite's on-orbit checkout phase following its launch. The MSX experiment for this mission involves a checkout of the satellite's ability to acquire, track, and accurately point at the Shuttle against Earth and space backgrounds. This capability is critical to the success of follow-on experiments related to plume and resident space object (RSO) characterization.

The MSX Shuttle Plume Observations involve observing the Shuttle while various Reaction Control System or Orbital Maneuvering System engines are fired in specified combinations, at various angles to the path of the Shuttle, and for specified durations. Images and spectra of the resulting plumes are observed in ultraviolet, visible, and infrared wavelength regions. The data will be used to understand the fundamental processes producing plume. The resulting understanding will be incorporated into models to predict what can be observed by space-based sensors from a wide variety of missile systems.

The MSX Shuttle RSO experiments involve acquiring and tracking the Shuttle body against a space, Earth limb, or hard Earth background. The data will be used to develop the capability for operational surveillance systems to acquire and track objects against a variety of backgrounds.

MILITARY APPLICATIONS OF SHIP TRACKS (MAST)

The Office of Naval Research (ONR) is sponsoring the Military Applications of Ship Tracks (MAST) experiment on STS-70. MAST, which flew for the first time on STS-65 in July 1994, is part of a five-year research program developed by ONR to examine the effects of ships on the marine environment. The Naval Postgraduate School, Monterey, CA, will conduct the experiment at the Johnson Space Center during the mission.

The objective of MAST is to determine how pollutants generated by ships modify the reflective properties of clouds. Ship tracks are observed in satellite imagery as long, narrow, curvilinear cloud features that have greater brightness than the surrounding clouds. The STS-70 crew will photograph ship tracks using large format, handheld cameras. These high-resolution photographs will provide insight into the processes of ship track production on a global scale. MAST will help in understanding the effects of man-made aerosols on clouds and the resulting impact on the climate system.

MAST is a DOD payload and is being flown under the direction of the DOD Space Test Program.

RADIATION MONITORING EQUIPMENT -III (RME-III)

RME stands for Radiation Monitoring Equipment, the name given to prototype dosimeter instruments flown on the Space Shuttle. RME-III has been successfully flown on various Space Shuttle missions since STS-31. RME is being integrated and flown on the STS-70 mission under the direction of the Defense Department's Space Test Program. It has been flown in conjunction with other radiation experiments, such as the CREAM (Cosmic Radiation Effects and Activation Monitor) and SAM (Shuttle Activation Monitor).

RME-III is an instrument which measures the exposure to ionizing radiation on the Space Shuttle. It displays the dose rate and total accumulated radiation dose to the operator, while simultaneously registering the number of radiation interactions and dose accumulated at ten second intervals. This data is stored in RME-III's memory module(s), for follow-up analysis upon return to Earth. The radiation detector used in the instrument is a spatial ionization chamber called a tissue equivalent proportional counter (TEPC) which effectively simulates a target size of a few microns of tissue, the dimensions of a typical human cell. For this reason, TEPC-based instruments such as the RME-III are called micro-dosimeter instruments.

The data obtained from the RME-III are archived and are being used to update and refine models of the space radiation environment in low-Earth orbit. This will assist space mission planners to more accurately assess risk and safety factors in future long-term space missions, such as the international Space Station. RME-III also has been used to measure radiation exposure in high altitude aircraft, such as the Concorde.

WINDOW EXPERIMENT (WINDEX)

The objective of WINDEX is to gain an understanding of the chemistry and dynamics near a Low-Earth-Orbit (LEO) satellite. This information will prevent misinterpretation of the measurements of the Earth, solar system, and stars from LEO platforms. This knowledge also will prevent damage to sensitive systems and solar arrays during rendezvous and docking operations.

WINDEX will record the dynamics of thruster plumes, Shuttle glow, water dumps, atmospheric nightglow, aurora, and flash evaporator system (FES) releases. Thruster plumes provide the largest perturbations on the LEO environment. Thruster firings can enhance the local densities of gases by several orders of magnitude and introduce numerous non-natural elements. These non-natural elements react with the atmosphere or with the spacecraft systems in the plume cloud. WINDEX would like to record the high speed ($< 10^{-9}$ sec) phenomena associated with the start-up and shut-down transients of the thruster as well as observe how these transients affect the Shuttle glow. Shuttle glow can be an indicator of the flow field around the Shuttle. Measurements of the Shuttle glow will help us understand the chemistry around the Shuttle and obtain a measure of the optical contamination of LEO based sensors. Low-light level spectrally resolved images will provide this information.

Water dumps, FES releases, and fuel cell purges also are a major contributor to the non-natural environment around a LEO satellite. WINDEX will look at water dumps to identify particle size and freezing dynamics of liquid water releases in the LEO environment. In order to separate the optical emissions of the near-field glow or plume data from the natural background, WINDEX must obtain atmospheric nightglow information. WINDEX will accomplish this by obtaining spectrally resolved images of limb and nadir night glow. This data will identify the dynamics of the middle and upper atmosphere (50 - 300 Km altitude). Information on the aurora will also help define the natural background environment of LEO platforms.

WINDEX is integrated and flown under the direction of the DOD Space Test Program.

VISUAL FUNCTION TESTER - 4 (VFT-4)

Since the Gemini space flights three decades ago, some of NASA's Shuttle astronauts have described a loss in their ability to see clearly at close range when in space. Interestingly enough, most of the astronauts experiencing this change were in their early forties and could see clearly without reading glasses when they were on the ground. Vision scientists at Human Systems Center's Armstrong Laboratory at Wright-Patterson AFB want to know why.

The next step in seeking the answers begins when the Discovery begins its eight-day mission, carrying with it an instrument that measures the range of how close and far away the human eye can see clearly while in near zero gravity conditions, often referred to as microgravity. The instrument, called the Vision Function Tester - 4 (VFT-4), was invented and patented by two Armstrong Laboratory scientists, Dr. H. Lee Task and Colonel Louis Genco.

Based on astronauts' accounts, the reasons why eyesight may change in space have been narrowed to two possible explanations. VFT-4 gives researchers a chance to get first-hand information and test those ideas. One theory put forth by the Principal Investigator, Lt .Col. Gerald Gleason, a vision scientist with the Visual Displays Systems Branch, Human Engineering Division, Crew Systems Directorate, is that the eye is like a water balloon. Rest it on a table and it gets longer as it flattens out (which is the normal condition on Earth). Put that balloon in space and it shortens, becoming more round. The eye could do the same thing and when it shortens it becomes far-sighted, causing more difficulty seeing objects up close. In addition to taking pre-and post-flight measurements of two astronauts' eyes using the Vision Function Tester, the participating astronauts will use the instrument daily throughout the Shuttle flight. The information gathered during these 30-minute sessions will also help Armstrong scientists evaluate how quickly the eye adjusts in space and how it is affected over time.

The results of the Shuttle experiments are relevant to the Department of Defense as the information will be used to better simulate a microgravity environment on the ground. In turn, contact lenses or reading glasses may be prescribed to compensate for the changes astronauts and military pilots experience in microgravity.

VFT-4 is integrated and flown aboard the Space Shuttle under the direction of the Department of Defense Space Test Program. This program is open to all experiments within the DOD desiring space flight. The vision experiments aboard Discovery are the second in a series of a projected five to be conducted aboard Space Shuttle missions over the next two years.

SHUTTLE AMATEUR RADIO EXPERIMENT (SAREX)

Students in the U.S. and Argentina will have a chance to speak via amateur radio with astronauts aboard the Discovery. Ground-based amateur radio operators ("hams") will be able to contact the Shuttle through automated computer-to-computer amateur (packet) radio links. There also will be voice contacts with the general ham community as time permits.

The radio contacts are part of the SAREX (Shuttle Amateur Radio EXperiment) project, a joint effort by NASA, the American Radio Relay League (ARRL), and the Radio Amateur Satellite Corporation (AMSAT).

The project, which has flown on 17 previous Shuttle missions, is designed to encourage public participation in the space program and support the conduct of educational initiatives through a program to demonstrate the effectiveness of communications between the Shuttle and low-cost ground stations using amateur radio voice and digital techniques.

Space Shuttle Mission Specialist Donald Thomas (call sign KC5FVF) will talk with students in 10 schools in the U.S. and Argentina using "ham radio."

Students in the following schools will have the opportunity to talk directly to orbiting astronauts for approximately 4 to 8 minutes:

- Hook Elementary School, Troy, OH (KA8CBE)
- East Memorial Elementary School, Farmingdale, NY (N2PSG)
- Concord High School, Concord, NH (N1JHJ)
- Schenectady Museum Amateur Radio Station, Schenectady, NY (WB2CRZ)
- Euclid High School, Euclid, OH (WA8WKQ)
- Milford High School, Highland, MI (N8IHO)
- ITT Technical Institute, Grand Rapids, MI (WJ8F)
- Gulf Middle School, New Port Richey, FL (KD4SSU)
- Fallbrook Union High School, Fallbrook, CA (KM6WF)
- Colegio San Nicolas, Santa Fe, Argentina (LU2FCY)

Several audio and digital communication services have been developed to disseminate Shuttle and SAREX-specific information during the flight.

The ARRL ham radio station (W1AW) will include SAREX information in its regular voice and teletype bulletins.

The amateur radio station at the Goddard Space Flight Center, (WA3NAN), will operate around the clock during the mission, providing SAREX information, retransmitting live Shuttle air-to-ground audio, and retransmitting many SAREX school group contacts.

Information about orbital elements, contact times, and crew operating schedules will be available during the mission from NASA ARRL (Steve Mansfield, 203/666-1541) and AMSAT (Frank Bauer, 301/286-8496). AMSAT will provide information bulletins for interested parties on Internet and amateur packet radio.

Current Keplerian elements to track the Shuttle are available from the NASA Spacelink computer information system (BBS), (205) 895-0028 or via Internet spacelink.msfc.nasa.gov, and the ARRL BBS (203) 666-0578. The latest element sets and mission information also are available via the Johnson Space Center (JSC) ARC BBS or the Goddard Space Flight Center (GSFC) BBS. The JSC number is (713) 244-5625, 9600 Baud or less. The GSFC BBS is available via Internet. The address is wa3nan.gsfc.nasa.gov.

STS-70 SAREX Frequencies

Routine SAREX transmissions from the Space Shuttle may be monitored on a worldwide downlink frequency of 145.55 MHz.

The voice uplink frequencies are (except Europe):

144.91 MHz
144.93
144.95
144.97
144.99

The voice uplink frequencies for Europe are:

144.70
144.75
144.80

Note: The astronauts will not favor any one of the above frequencies. Therefore, the ability to talk to an astronaut depends on selecting one of the above frequencies chosen by the astronaut.

The worldwide amateur packet frequencies are:

Packet downlink 145.55 MHz
Packet uplink 144.49 MHz

The GSFC amateur radio club planned HF operating frequencies:

3.860 MHz 7.185 MHz
14.295 21.395
28.650

STS-70 CREW BIOGRAPHIES

Terence "Tom" Henricks **Commander**

Air Force Colonel **Terence "Tom" Henricks**, 42, will serve as commander of Discovery.

Born in Bryan, OH, Henricks considers Woodville, OH, to be his hometown. Henricks received a bachelor's degree in civil engineering from the United States Air Force Academy in 1974, and a master's in public administration from Golden Gate University in 1982. He has logged 747 parachute jumps and more than 4,700 hours flying time.

Henricks completed his pilot training at Craig Air Force Base in Selma, AL, and F-4 conversion training at Homestead Air Force Base in Miami, FL. He then flew in F-4 fighter squadrons in England and Iceland. He attended the USAF Test Pilot School in 1983 and remained at Edwards AFB, CA, as an F-16C test pilot and chief of the 57th Fighter Weapons Wing Operating Location until he was selected as an astronaut in 1985.

Since joining NASA, Henricks has re-evaluated Shuttle landing sites around the world; served as assistant manager for Engineering Integration in the Shuttle Program Office; worked as lead astronaut of the Shuttle Avionics Integration Laboratory at the Johnson Space Center and of the Vehicle Test and Checkout Office at the Kennedy Space Center.

Henricks has served as pilot of two space flights. His first mission was STS-44 in November 1991. The primary mission was to deploy the Defense Support Program satellite with an Inertial Upper Stage rocket booster. His second mission, STS-55 in April 1993, was a cooperative Spacelab mission with the German Space Agency which included 89 different experiments in materials processing, life sciences, robotics, technology, astronomy and Earth mapping.

Henricks has logged over 405 hours in space.

Kevin Kregel **Pilot**

Pilot **Kevin Kregel**, 38, will be making his first space flight. Kregel, who was born in New York City, considers Amityville, NY, to be his hometown.

Kregel earned a bachelor's degree in astronautical engineering from the U.S. Air Force Academy in 1978 and a master's degree in public administration from Troy State University in 1988.

Kregel earned his pilot's wings in 1979 at Williams Air Force Base, AZ. From 1980 to 1983, he was assigned to F-111 aircraft at RAF Lakenheath. While serving as an exchange officer flying A-6E aircraft with the U.S. Navy at NAS Whidbey Island in Seattle, WA, and aboard the USS Kitty Hawk, Kregel made 66 carrier landings during

a cruise of the Western Pacific. His next assignment was another exchange tour at the U.S. Naval Test Pilot School at Patuxent River, MD. Upon graduation he was assigned to Eglin AFB, FL, conducting weapons and electronic systems testing on the F-111, F15 and the initial weapons certification test of the F15E aircraft.

Kregel resigned from active duty in 1990 to take a position as an aerospace engineer and instructor pilot at JSC's Ellington Field offices. His primary responsibilities included flying as an instructor pilot in the Shuttle Training Aircraft and conducting the initial flight test of the T-38 avionics upgrade.

Selected as an astronaut in March 1992, Kregel has served as the Astronaut Support Personnel Team at the Kennedy Space Center.

**Donald Thomas,
Mission Specialist 1**

Cleveland native **Donald Thomas**, Ph.D., 40, will be making his second flight as Mission Specialist 1.

Thomas holds a bachelor's degree in physics from Case Western Reserve University in 1977, and master's and doctorate degrees in materials science from Cornell University in 1980 and 1982, respectively.

Following his graduation, Thomas joined AT&T Bell Laboratories in Princeton, N.J., working as a senior member of the technical staff. He also served as an adjunct professor in the Physics Department of Trenton State College. He holds two patents and has authored several technical papers.

Thomas left AT&T in 1987 to work for Lockheed Engineering and Sciences Company in Houston, where his responsibilities involved reviewing materials used in the Shuttle payloads. In 1988, he joined the Johnson Space Center as a materials engineer, working on analysis of advanced composite materials for use on the Space Station. He also was principal investigator for the Microgravity Disturbances Experiment on STS-32.

Thomas was selected as an astronaut in January 1990. His first mission, STS-65 in July 1994, was a 15-day Spacelab flight which included 80 experiments focusing on materials and life sciences research in space. With the completion of that mission, Thomas has logged almost 354 hours in space.

**Nancy Currie
Mission Specialist 2**

Army Major **Nancy Currie**, 36, will make her second space flight as Mission Specialist 2 during STS-70.

Born in Wilmington, DE, Currie considers Troy, OH, to be her hometown. She received a bachelor's degree in biological science from Ohio State University in 1980 and a master's in safety engineering from the University of Southern California in 1985.

Following her graduation from Ohio State University, Currie served as a neuropathology research assistant at the OSU College of Medicine. She was commissioned as a lieutenant in the U.S. Army in July 1981 and has served in a variety of leadership positions including helicopter instructor pilot, section leader, platoon leader and Brigade flight standardization Officer. As a senior army aviator, Currie has logged over 3,300 flying hours in a variety of rotary-wing and fixed-wing aircraft. She has instructed in all phases of rotary-wing flight, including combat skills and night vision goggle operations.

She was assigned to the Johnson Space Center in September 1987 as a flight simulation engineer on the Shuttle Training Aircraft and was subsequently selected as an astronaut in 1990. Since joining the astronaut corps, she has served as the lead for flight crew equipment, the Remote Manipulator System and as a spacecraft communicator.

Her first space flight occurred in June 1993 on STS-57. The primary objective of the mission was to retrieve the European Retrievable Carrier satellite. The mission also featured the first flight of the Spacehab module, carrying 22 microgravity experiments and featured a space walk by two crew members..

After the one flight, Currie has accumulated 239 hours in space.

Mary Ellen Weber Mission Specialist 3

Rounding out the STS-70 crew will be **Mary Ellen Weber**, Ph.D., 32, who will serve as Mission Specialist 3.

Born in Cleveland, OH, Weber considers Bedford Heights, OH, to be her hometown. She holds a bachelor's degree in chemical engineering from Purdue in 1984 and a doctorate in physical chemistry from the University of California-Berkeley in 1988.

During her undergraduate studies at Purdue, Weber held engineering internships at Ohio Edison, Delco Electronics and 3M. After her graduation, she joined Texas Instruments to research new techniques in microelectronics manufacturing. In 1990, she was assigned to SEMATECH, a U.S. semiconductor manufacturing consortium in Austin, TX, to develop novel high-density plasma reactors for silicon etching. This work led to a further assignment at Applied Materials and Technology in Santa Clara, CA, to develop a world-class plasma etcher. She holds one patent and has published eight technical papers. She also is a national competitive sky diver with over 1,900 jumps.

Weber was selected as an astronaut in March 1992. Since then she has assisted in Shuttle processing and launches for the Astronaut Office and has worked in the Shuttle Avionics Integration Laboratory.

STS-70 is her first space mission.

SHUTTLE FLIGHTS AS OF APRIL 1995

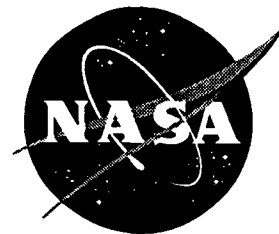
68 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM — 43 SINCE RETURN TO FLIGHT

STS-51-L 01/28/86	STS-65 07/08/94 - 07/23/94	STS-63 02/03/95 - 02/11/95		
STS-51-A 10/30/85 - 11/06/85	STS-62 03/04/94 - 03/18/94	STS-64 09/09/94 - 09/20/94		
STS-51-F 07/29/85 - 08/06/85	STS-58 10/18/93 - 11/01/93	STS-60 02/03/94 - 02/11/94		
STS-51-B 04/29/85 - 05/06/85	STS-55 04/26/93 - 05/06/93	STS-51 09/12/93 - 09/22/93		
STS-41-G 10/05/84 - 10/13/84	STS-52 10/22/92 - 11/1/92	STS-56 04/08/93 - 04/17/93		
STS-41-C 04/06/84 - 04/13/84	STS-50 06/25/92 - 07/09/92	STS-53 12/2/92 - 12/9/92		
STS-41-B 02/03/84 - 02/11/84	STS-40 06/05/91 - 06/14/91	STS-42 01/22/92 - 01/30/92		
STS-8 08/30/83 - 09/05/83	STS-35 12/02/90 - 12/10/90	STS-48 09/12/91 - 09/18/91	STS-66 11/03/94 - 11/14/94	
STS-7 06/18/83 - 06/24/83	STS-32 01/09/90 - 01/20/90	STS-39 04/28/91 - 05/06/91	STS-46 7/31/92 - 8/8/92	
STS-6 04/04/83 - 04/09/83	STS-28 08/08/89 - 08/13/89	STS-41 10/06/90 - 10/10/90	STS-45 03/24/92 - 04/02/92	
	STS-61-C 01/12/86 - 01/18/86	STS-31 04/24/90 - 04/29/90	STS-44 11/24/91 - 12/01/91	
	STS-9 11/28/83 - 12/08/83	STS-33 11/22/89 - 11/27/89	STS-43 08/02/91 - 08/11/91	
	STS-5 13/11/82 - 13/16/82	STS-29 03/13/89 - 03/18/89	STS-37 04/05/91 - 04/11/91	STS-67 03/02/95 - 03/18/95
	STS-4 06/27/82 - 07/04/82	STS-26 09/29/88 - 10/03/88	STS-38 11/15/90 - 11/20/90	STS-68 09/30/94 - 10/11/94
	STS-3 03/22/82 - 03/30/82	STS-51-J 08/27/85 - 09/03/85	STS-36 02/28/90 - 03/04/90	STS-59 04/09/94 - 04/20/94
	STS-2 11/12/81 - 11/14/81	51-G 06/17/85 - 06/24/85	STS-34 10/18/89 - 10/23/89	STS-61 12/2/93 - 12/13/93
	STS-1 04/12/81 - 04/14/81	51-D 04/12/85 - 04/19/85	STS-30 05/04/89 - 05/08/89	STS-57 6/21/93 - 7/1/93
		STS-51-C 01/24/85 - 01/27/85	STS-27 12/02/88 - 12/06/88	STS-54 01/13/93 - 01/19/93
		STS-51-A 11/08/84 - 11/16/84	STS-61-B 11/26/85 - 12/03/85	STS-47 09/12/92 - 09/20/92
		STS-41-D 08/30/84 - 09/04/84	STS-51-J 10/03/85 - 10/07/85	STS-49 05/07/92 - 05/16/92
OV-099 Challenger (10 flights)	OV-102 Columbia (17 flights)	OV-103 Discovery (20 flights)	OV-104 Atlantis (13 flights)	OV-105 Endeavour (8 flights)

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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For Release

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May 18, 1995

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RELEASE: 95-72

SATURN'S RINGS: NOW YOU SEE THEM, NOW YOU DON'T

The rings of Saturn will all but disappear for a few moments on May 22 during a rare astronomical event that will allow astronomers to look for new moons and other features that are normally obscured by the glare of the dazzling rings.

Many of the world's major telescopes, including NASA's Hubble Space Telescope, will focus on Saturn during the 24-minute event.

The phenomenon is known to astronomers as a Saturn ring plane crossing. This year and next, the rings will be seen edge-on from the Earth's perspective on three occasions -- May 22 and August 10, 1995, and Feb. 11, 1996. This event only happens about every 15 years.

Ring plane crossings provide astronomers with unique views of the Saturnian system. With the rings temporarily invisible as viewed from Earth, faint objects near the planet are easier to see. Thirteen of Saturn's 18 known moons have been discovered during past ring plane crossings.

The faint, outermost E-ring also is easier to detect when viewed edge-on due to the greater amount of material in the line-of-sight. Thus, observations made over the course of the ring plane crossing also can be used to gather new information on the thickness of the rings and to search for new rings.

The event is of special interest to scientists and engineers at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA, who are fine-tuning the flight path of the Cassini spacecraft. Cassini is scheduled for launch on a mission to Saturn in

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1997, jointly conducted by NASA, the European Space Agency and the Italian Space Agency. Any new data on the location and density of material in the rings will help the Cassini team plan the most advantageous and safest course for the spacecraft to take when it flies through the rings upon arrival at Saturn in 2004.

"We're going in awfully close with Cassini," said mission scientist Dr. Linda Horn of JPL, "so the more we know about the boundaries of the rings, the more confident we'll be." Plans call for the spacecraft to fly through a 15,500-mile (25,000-kilometer) gap between the F- and G-rings, then closely over the broad C-ring. Later, the spacecraft will make several passes through the E-ring.

Astronomers hope to refine measurements of Saturn's small, inner moons during the ring plane crossing. Better estimates of the moons' sizes will be useful in targeting Cassini's observations of those satellites, according to Horn.

Saturn's rings are known to be numerous, dynamically complex and made up of countless particles of ice ranging in size from boulders to snowflakes, with some rock mixed in. They are thought to be the remains of comets, meteoroids and possibly small moons that have been captured and torn apart by Saturn's gravity.

The rings are a prime target for the science instruments aboard the Cassini spacecraft, whose mission is to study the Saturnian system while orbiting the planet for four years. Cassini also will carry the European Space Agency's Huygens Probe to be dropped into the atmosphere of Saturn's large moon Titan. As it parachutes downward, the Huygens Probe will return information about Titan's atmosphere and surface. In some ways scientists believe Titan resembles Earth as it existed in a primordial stage before life developed.

The Cassini Project is managed by JPL for NASA's Office of Space Science in Washington, DC.

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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For Release

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May 19, 1995

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RELEASE: 95-73

REVIEW TEAM PROPOSES SWEEPING MANAGEMENT, ORGANIZATIONAL CHANGES AT NASA

An internal NASA review team has produced proposals to enable the agency to meet the tough funding targets set by the Administration in the 1996 budget, Administrator Daniel S. Goldin said today. The proposals include sweeping management and organizational changes to cut spending an additional \$5 billion by the end of the decade.

"I'm pleased with what I've seen so far," Goldin said. "We've found ways to streamline operations, reduce overlap, and significantly cut costs without cutting our world-class space and aeronautics programs. We have much hard work before us, but I believe a stronger and more efficient NASA will emerge."

The internal review does not propose closing any of the agency's ten major field centers, or shutting down any major programs. Goldin said he is determined to cut infrastructure at the Agency by reducing jobs, facilities, and administrative overhead, rather than terminating core science, aeronautics, and exploration programs. However, Goldin warned that further deep budget cuts now under consideration in Congress would threaten the survival of some NASA centers and major Agency programs.

"Reaching the levels in the Administration budget was an incredibly difficult task," Goldin said. "The deeper cuts Congress is contemplating simply go too far, and I am committed to fighting them."

"NASA was already in the process of taking a \$35 billion (31%) cut over five years when the President asked us to cut an additional \$5 billion. This is an agency designed to operate with a \$22 billion budget annually, and we'll be at \$13 billion by the end of the decade under the Administration budget," Goldin said.

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"The American public wants a leaner, more efficient NASA, and we're prepared to meet that challenge. But they also want and deserve a NASA that maintains our nation's leadership in space exploration, aeronautics, science, and technology," he said.

The internal review, known as the "Zero-Base Review," proposes streamlining functions at the NASA centers, so each installation becomes a "center of excellence," concentrating on specific aspects of NASA's mission. At the same time, the proposed changes would reduce overlap and consolidate administrative and program functions across the Agency.

Under the review team's findings, NASA's total civil service employment levels would be cut to approximately 17,500 by the year 2000. This is the lowest level of civil servants at NASA since 1961. In addition, the budget reductions would cut an estimated 25,000 contractor personnel. The actual number and distribution of contractor job losses Agencywide would be determined by future business decisions made by the contractors.

The review team proposals will be assessed through the summer months and then become part of the Agency's Fiscal Year 1997 budget, due to be submitted to the Office of Management and Budget later this year. Goldin began the review last September following guidelines issued by the National Performance Review, a Government-wide effort headed by Vice President Gore to streamline executive agencies. The NASA study intensified in January to meet the President's budget reduction targets.

Zero-Base Review Operating Guidelines

In performing the study, the Zero-Base Review Team adopted the following operating guidelines.

- Each field center will have a primary mission to reflect its role in a strategic enterprise. NASA's strategic plan has established a framework for managing the Agency by concentrating key activities into "strategic enterprises." The five strategic enterprises are Mission to Planet Earth, Aeronautics, Human Exploration and Development of Space, Space Science, and Space Technology.
- Full program costs, including overhead as well as direct costs, will be identified and managed more effectively.
- Only Civil Servants, Jet Propulsion Laboratory employees, and employees of the new institutes will perform in-house science, research and engineering.
- Aerospace operations, including the Space Shuttle, will be performed by NASA contractors.

- Outsourcing and commercial services will be maximized.
- Agency activities and operations will be standardized to the maximum extent possible and commercially available products will be used as appropriate.

Actions Taken/Decisions Made

As part of its reinvention process, NASA has already made a number of decisions to reduce costs and achieve maximum efficiency. Among them:

- NASA has discontinued construction of a Space Shuttle solid rocket motor nozzle fabrication and refurbishment facility at Yellow Creek, MS. The move will save between \$450 and \$500 million through the year 2012.
- NASA will consolidate the Earth Observing System Data and Operations System function for the first EOS spacecraft at White Sands, NM. This move will save up to \$30 million through the year 2000.
- NASA will consolidate software independent verification and validation functions at Fairmont, WV.
- Through a series of management actions, including two employee buyouts, NASA has substantially reduced total personnel. The two buyouts resulted in a reduction of Civil Service staffing by more than 2,600. Other factors, including attrition, have brought total Civil Service full-time staffing levels at NASA from 24,030 in January 1993 to 21,060 in April 1995.
- In line with the Administration's goals of reducing Washington headquarters staffing, the NASA Headquarters workforce has been reduced by 400 employees from January 1993 to April 1995, a 20 percent reduction. Headquarters is on track for an overall 50 percent reduction in personnel.
- Support service contract costs at NASA Headquarters have been reduced significantly. Staffing has been reduced by approximately 25 percent and total costs for support contracts are down approximately 33 percent for an annual savings in excess of \$50 million. Similar reviews of support service contracts are underway at each of the NASA centers.
- NASA has canceled approximately \$60 million in spending on custom software for a financial management system in favor of using less expensive, off-the-shelf technology.
- Each field center will be assigned a clearly defined mission, structured along a series of strategic enterprises and functional responsibilities. See the attached "Center Roles and Responsibilities," for additional details.

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- Each NASA center, in self-assessments done for the Zero-Base Review, has identified a series of cuts and cost-saving measures. Those cuts will be included in the formulation of NASA's FY 1997 budget submittal.

Further Actions Under Consideration

A number of additional measures proposed by the Zero-Base Review Team are being provided as guidelines for the 1997 budget. These include:

- Reassigning and consolidating functional management responsibilities (such as personnel management, payroll and other administrative functions) to designated lead centers, a move that would reduce overlap. This approach would allow the Agency to take advantage of advanced technologies to deliver the same services for less money.
- Consolidating wide area networks at a single location and contracting for information and communications services. Currently, each NASA center has significant resources devoted to information systems infrastructure.
- Eliminating some administrative aircraft, and consolidating research aircraft operations at a single location.
- Transitioning the management of some science programs to institutes located on or near NASA sites. These institutes would be operated by a university, private industry, or a teaming arrangement.
- Restructuring the Space Shuttle program and preparing it for contractor consolidation and privatization.

Attachment

-end-

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Center Roles and Responsibilities

One of the most important management changes being made by NASA is the identification and implementation of carefully defined roles for each field installation. NASA's senior management already has agreed to a specific mission and area of excellence for each Center. One lead Center will manage everything within its area of excellence. Also shown below are proposed realignments that will be reflected in the Agency's FY 1997 budget guidance. Detailed analysis will occur throughout the summer as part of that process.

Under the review team's findings, NASA's total civil service workforce would be cut to approximately 17,500 by FY 2000. The actual number and distribution of contractor job losses Agencywide would be determined by future business decisions made by the contractors. The job estimates below are accurate within 15 percent.

Ames Research Center *Mountain View, CA*

Mission:	Airspace Operations Systems and Astrobiology
Center of Excellence:	Information Technology
Proposed Realignments:	Establish a science institute for astrobiology; retain core in-house aeronautics research capability; consolidate management of aeronautical facilities with Langley Research Center facilities; transfer Moffett airfield; transfer aircraft to Dryden Flight Research Center.
Job Changes by FY 2000:	Estimated Civil Service Losses: -300 Estimated Contractor Losses: -1,140 Percentage of FY 1996 Baseline: -35%

Dryden Flight Research Center *Edwards, CA*

Mission:	Flight Research
Center of Excellence:	Atmospheric Flight Operations
Proposed Realignments:	Assume flight operations management of all aircraft except those in support of the Space Shuttle.
Job Changes by FY 2000:	Estimated Civil Service Gains: +200 Estimated Contractor Gains: +100 Percentage of FY 1996 Baseline: +32%

Goddard Space Flight Center
Greenbelt, MD

Mission: Earth Science/Physics and Astronomy

Center of Excellence: Scientific Research

Proposed Realignments: Transfer Goddard Institute for Space Studies to a university/consortium; consolidate management of the Suborbital program at Goddard; reduce cost of Wallops Flight Facility operations and investigate additional cost-sharing opportunities; increase partnerships with NOAA; consolidate management of communications infrastructure at Johnson Space Center; privatize space science data archiving and distribution; reduce in-house spacecraft development; transfer aircraft to Dryden Flight Research Center.

Job Changes by
FY 2000: Estimated Civil Service Losses: -550
Estimated Contractor Losses: -2,650
Percentage of FY 1996 Baseline: -28%

Jet Propulsion Laboratory
Pasadena, CA

Mission: Planetary Science and Exploration

Center of Excellence: Deep Space Systems

Proposed Realignments: Further study of proposal to commercialize ground tracking of low-Earth orbit spacecraft; reduce in-house spacecraft development.

Job Changes by
FY 2000: Estimated Civil Service Losses: N/A
Estimated Contractor Losses: -1,250
Percentage of FY 1996 Baseline: -22%

Johnson Space Center
Houston, TX

Mission: Human Exploration and Astro Materials

Center of Excellence: Human Operations in Space

Proposed Realignments: Transfer management of White Sands Test Facility to Stennis Space Center; assume management of communications infrastructure; establish institutes for biomedical and planetary science; streamline engineering and facilities (no personnel transfers).

Job Changes by
FY 2000: Estimated Civil Service Losses: -500
Estimated Contractor Losses: -2,750
Percentage of FY 1996 Baseline: -21%

Kennedy Space Center
Kennedy Space Center, FL

Mission/Center of Excellence: Space Launch

Proposed Realignments: Shuttle contractor consolidations; assume management of Atlas-class expendable launch vehicles from Lewis Research Center.

Job Changes by
FY 2000: Estimated Civil Service Losses: -1,150
Estimated Contractor Losses: -2,000
Percentage of FY 1996 Baseline: -24%

Langley Research Center
Hampton, VA

Mission: Airframe Systems, Aerodynamics, and Atmospheric Science

Center of Excellence: Structures and Materials

Proposed Realignments: Provide program analysis and evaluation function for Agency; transition atmospheric science to an institute; transfer aircraft to Dryden Flight Research Center.

Job Changes by
FY 2000: Estimated Civil Service Losses: -200
Estimated Contractor Losses: -800
Percentage of FY 1996 Baseline: -21%

Lewis Research Center
Cleveland, OH

Mission:	Aeropropulsion
Center of Excellence:	Turbomachinery
Proposed Realignments:	Transfer Atlas-Class expendable launch vehicle management to Kennedy Space Center; retain Plumbrook on a fully-reimbursable basis; establish an institute for microgravity and space power; close the rocket engine test facility; transfer aircraft to Dryden Flight Research Center.
Job Changes by FY 2000:	Estimated Civil Service Losses: -400 Estimated Contractor Losses: -1,100 Percentage of FY 1996 Baseline: -33%

Marshall Space Flight Center
Huntsville, AL

Mission:	Transportation Systems Development and Microgravity
Center of Excellence:	Space Propulsion
Proposed Realignments:	Further study of proposed transfer of payload operations to Johnson Space Center; further study of establishing an institute for science, including hydrology; mothball the Technology Test Bed; provide technical excellence in large optical systems/mirrors.
Job Changes by FY 2000:	Estimated Civil Service Losses: -650 Estimated Contractor Losses: -1,350 Percentage of FY 1996 Baseline: -30%

Stennis Space Center
Stennis Space Center, MS

Mission/Center of
Excellence:

Propulsion Test

Proposed Realignment:

Assume management of White Sands Test Facility from Johnson Space Center; manage all future rocket propulsion testing; pursue National Propulsion Test Alliance.

Job Changes by
FY 2000:

Estimated Civil Service Losses: 0
Estimated Contractor Losses: -100
Percentage of FY 1996 Baseline: -9%

NASA Headquarters
Washington, DC

Mission/Center of
Excellence:

Corporate office

Proposed Realignment:

Reduce FY 1993 staffing level by 50 percent in accordance with National Performance Review guidelines; align selected program and functional responsibilities to field centers.

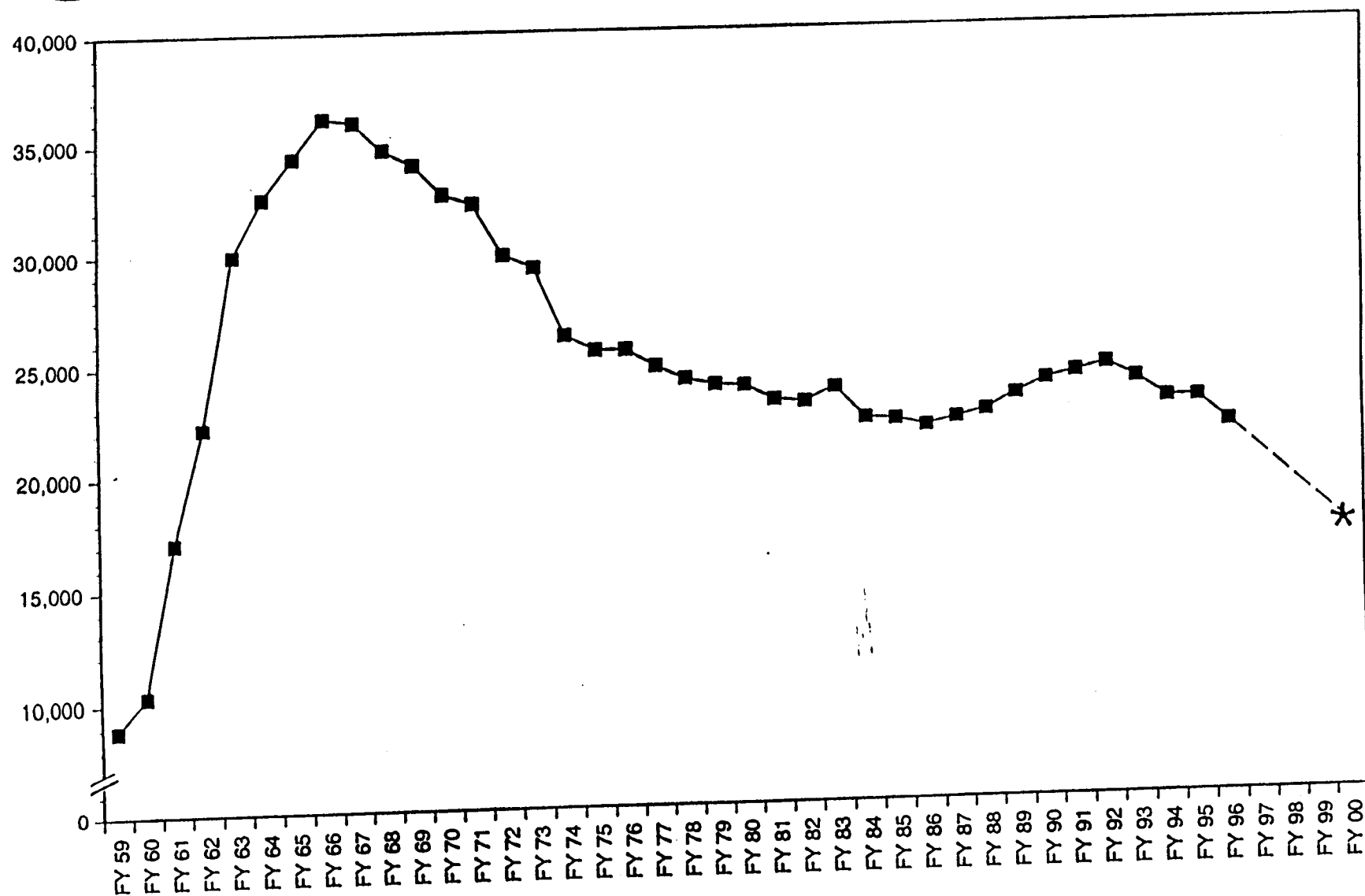
Job Changes by
FY 2000:

Civil Service Losses: -450
Estimated Contractor Losses: -500
Percentage of FY 1996 Baseline: -30%

Additionally, two areas not represented in the Center listings above will also provide significant workforce reductions. The Zero-Base Review anticipates that by consolidating information and communications systems across NASA, 1,800 contractor jobs will be eliminated Agencywide by FY 2000. Further, it is anticipated that by moving to a single prime contractor on the Space Shuttle program, another 5,000-10,000 contractor jobs will be eliminated Agencywide by FY 2000.



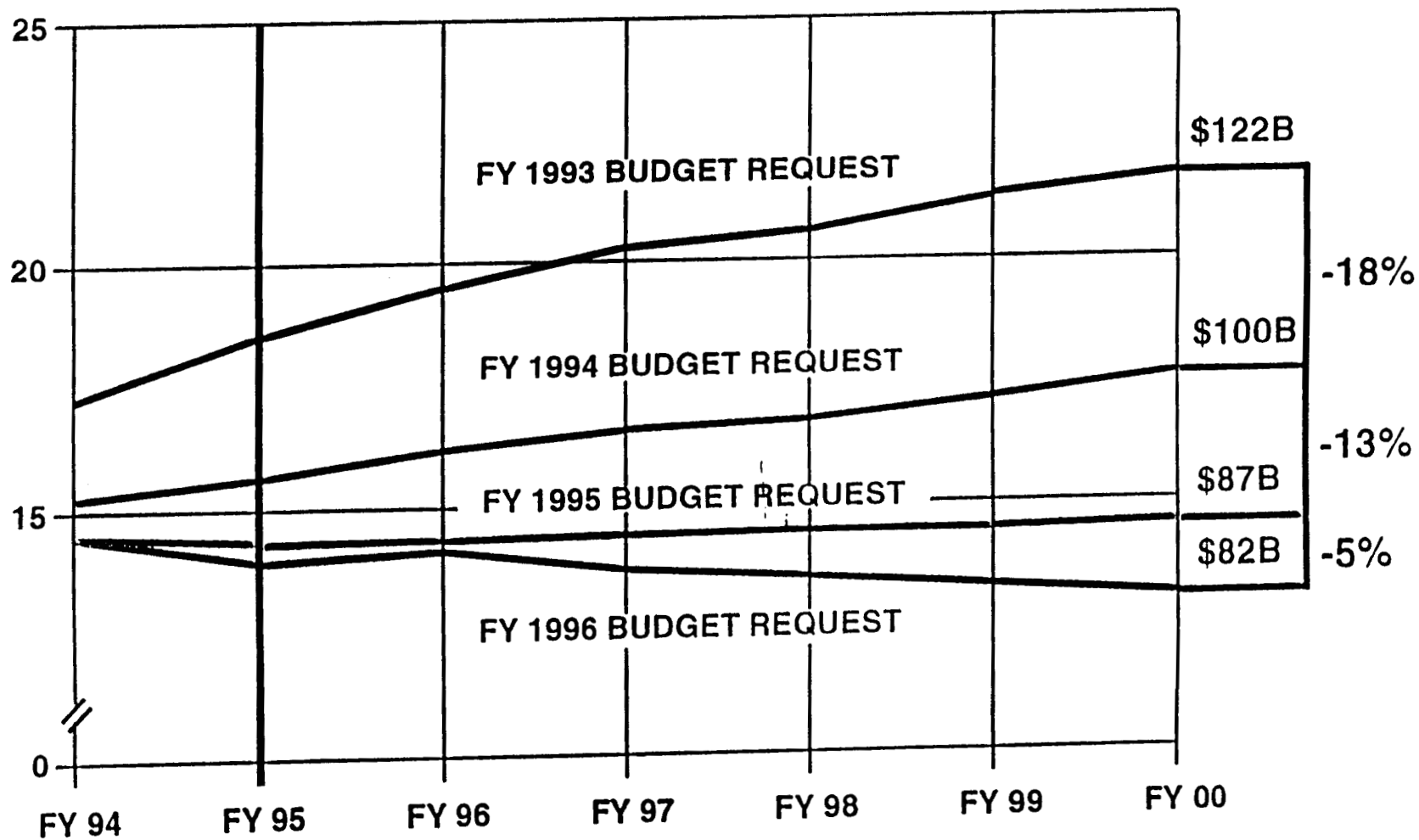
CIVIL SERVICE EMPLOYMENT





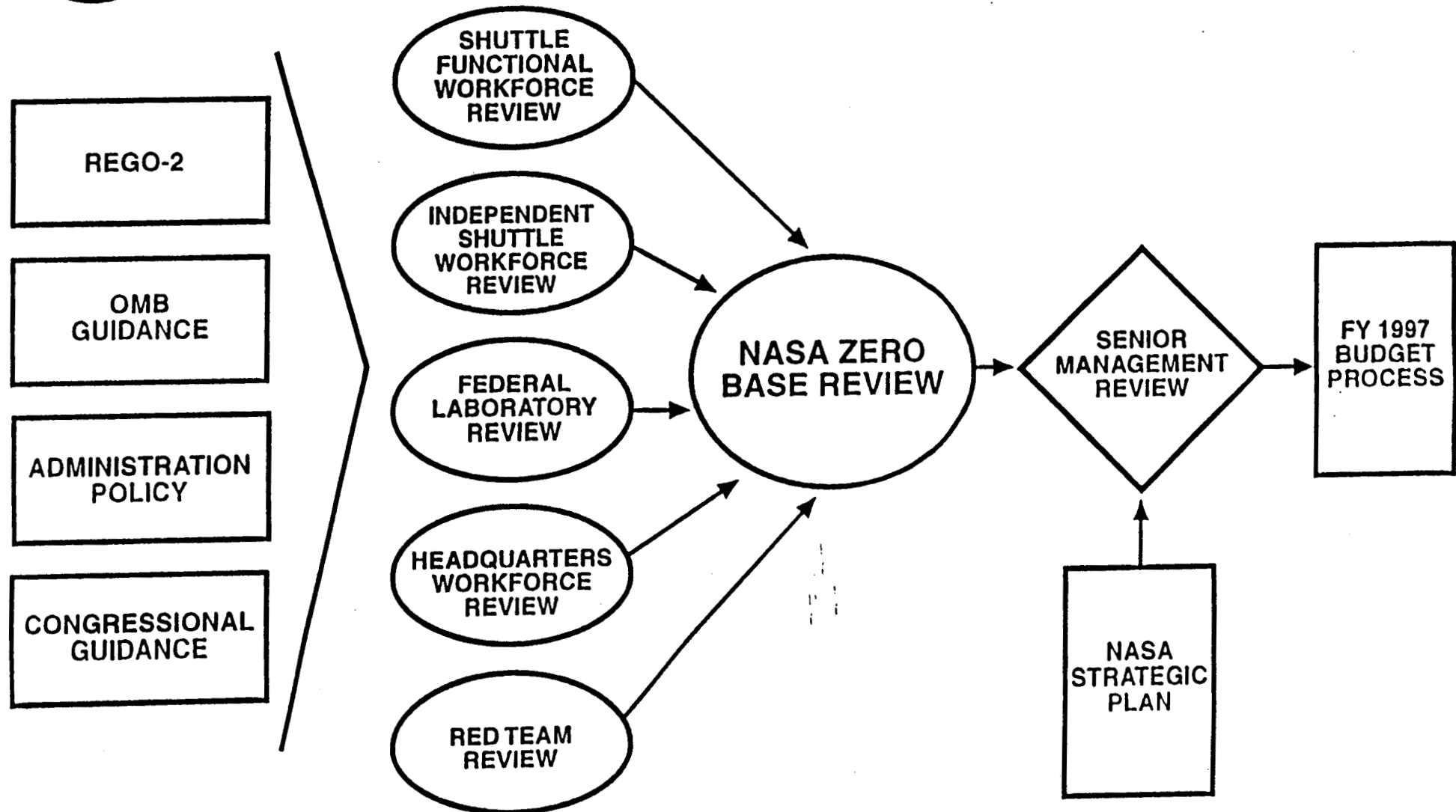
FY 1996 PRESIDENT'S BUDGET

REAL YEAR DOLLARS
(BILLIONS)





NASA REINVENTION PROCESS



Categories of Reductions*

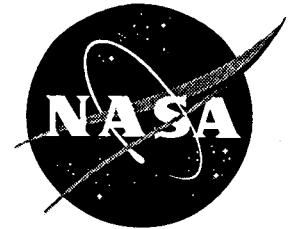
• Efficiencies	\$0.7
• Restructuring	\$1.3
• Privatization	\$1.3
• Commercialization	\$0.6
• Outsourcing	\$0.4
• Deregulation	\$0.0 - \$0.5
• Performance-based Contracting	<u>\$0.1 - \$0.2</u>
• TOTAL	\$4.4 - \$5.0

*Estimated Savings, \$B

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Mark Hess
Headquarters, Washington, DC
(Phone: 202/358-1778)

May 19, 1995

Jeffrey Carr
Johnson Space Center, Houston
(Phone: 713/483-3671)

RELEASE: 95-74

NASA TAKES ACTION TO IMPROVE SAFETY IN HUMAN RESEARCH

NASA today announced immediate actions to improve the safety of human subjects in Agency research efforts. The actions are being taken in response to the formal review of a mishap that occurred last year during a life sciences experiment at the Johnson Space Center, Houston, TX.

A Mishap Investigation Board was chartered by NASA's Office of Safety and Mission Assurance and charged with investigating the mishap, reviewing the policy and procedures regarding the approval and conduct of life sciences research, and making recommendations for optimizing the safety of human subjects in scientific research.

On October 16, 1994, one of six planned human subjects participating in a metabolic experiment experienced a reaction to the ingestion and infusion of two chemicals, Inutest and Indocyanine Green as prescribed in the experiment protocol. The attending physician monitoring the activity administered emergency medical care and the subject was taken to a local hospital for observation. The subject was later released and returned to work. The other five experiment subjects had no reaction to the chemicals.

The Board identified the primary cause of the mishap as an individually specific, yet unpredictable, hypersensitivity reaction ("idiosyncratic anaphylactoid reaction") to the administration of the Inutest and/or Indocyanine Green. The Board determined that there is no standard protocol available to pre-screen subjects for this reaction, and consequently the reaction was unpredictable. The Board concluded the response of the attending medical personnel during the mishap was timely and appropriate.

A number of observations and recommendations were made by the Board regarding emergency equipment and supplies inventory and configurations, test team training in the use of emergency equipment and life support procedures,

-more-

procedures for communicating information regarding known prior adverse reactions to a protocol in a prior subject, and emergency services notifications. The report notes that a number of recommendations have already been acted on and completed.

In addition, the Mishap Board reviewed policies and procedures of the Human Research Policy and Procedures Committee (HRPPC) at the Johnson Space Center regarding the review, approval and conduct of life sciences research. The Board recommended changes that would further improve the safety of life science research on human subjects, and advised that the membership of the HRPPC be reviewed with the intent of increasing the participation of medically trained members, providing representation for subject participants in experiments, providing bioethics training for members, and broadening participation by non-NASA personnel.

As a result of an internal study ordered by JSC Director Carolyn L. Huntoon, an Institutional Review Board (IRB) has been formed in place of the HRPPC. Many of the Mishap Board's other recommendations coincide with the already proposed changes in NASA-wide policy for protection of human research subjects.

An action plan has been developed by NASA's Office of Life and Microgravity Sciences detailing steps, many of which have already been taken, in response to the Mishap Board's findings and recommendations.

JSC is charged with the responsibility to develop an implementation plan by mid-June addressing all the remaining recommendations in both reports and describing any other management changes being made to further minimize the occurrence of medical mishaps. NASA's Office of Life & Microgravity Sciences will review and certify the implementation plan.

In addition, the Office of Life and Microgravity Sciences is coordinating with the Office for Protection from Research Risk to assure that NASA remains in full compliance with federal regulations and guidelines, and has accelerated completion of the revised NASA Management Instruction dealing with protection of human research subjects.

The IRB will conduct an immediate evaluation of the risk to astronauts associated with proposed research for any future flight missions.

-end-

Note to Editors: Copies of the Mishap Board reports can be obtained by contacting the Newsroom at either NASA Headquarters (202/358-1600) or the Johnson Space Center (713/483-5111).

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 21, 1995

VIDEO ADVISORY: V95-70

NEW HUBBLE IMAGE, COOL SUIT FEATURED ON NASA TV MONDAY

Monday's NASA TV video news file will feature a new image from the Hubble Space Telescope. The Hubble has discovered that white dwarf stars, found in the heart of two exploded double-star systems, are cooler and spin more slowly than expected. The lower than predicted heat level discovery by Hubble is causing astronomers to revise their theories on dwarf stars. Also airing on Monday will be a feature and interviews about NASA's "cool suit," a suit designed by NASA researchers to help Multiple Sclerosis sufferers by reducing body heat. Monday's video news file will close by re-airing animation and an interview examining Saturn plane rings. On Monday a phenomena known to astronomers as a Saturn ring plane crossing will make the planet's rings "edge on" in relation to the Earth, rendering them all but invisible. During the plane crossing, astronomers will be able to view objects near the planet without interference from the rings.

Video News File (transmission times: 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Hubble probes remnants of stellar explosion</i>	TRT: :38
ITEM #2: <i>Cool suit helps Multiple Sclerosis sufferers</i>	TRT: 1:26
ITEM #3: <i>Interview with Kristen Kauffman about the cool suit</i>	TRT: 2:25
ITEM #4: <i>Interview with Dr. Laurie Laven</i>	TRT: 2:26
ITEM #5: <i>Saturn ring plane crossing</i>	TRT: 1:03
ITEM #6: <i>Cassini spacecraft -- animation</i>	TRT: :08
ITEM #7: <i>Interview with Dr. Linda Horn on Saturn ring plane crossing</i>	TRT: 2:00

All TRT's are approximate and subject to change.

Public Affairs Contacts

Hubble Space Telescope	Don Savage	202/358-1547
Cool Suit	Mike Braukus	202/358-1979
Saturn plane crossing	Doug Isbell	202/358-1753

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

May 22, 1995

Kari Fluegel
Johnson Space Center, Houston
Phone: (713/483-5111)

NOTE TO EDITORS: N95-31

CONTROLLERS, ASTRONAUTS TO DISCUSS DOCKING MISSION JUNE 1-2

A history-making "handshake in space" will once again link the United States and Russia as the two nation's space programs come together with the docking of the Space Shuttle Atlantis to the Russian Mir space station next month.

Astronauts, flight controllers, and science investigators preparing for the mission will discuss the upcoming flight with reporters during a series of briefings June 1-2 at the Johnson Space Center, Houston, TX.

STS-71 is currently targeted to be launched from the Kennedy Space Center, FL, during the third week of June, carrying a seven-member crew to the Mir station. Atlantis, which will be outfitted with a new docking mechanism, will rendezvous with and link up to Mir on the third day of flight and will stay linked to the station for four days.

Atlantis will transport Mir 19 Cosmonauts Anatoly Solovyev and Nikolai Budarin to Mir and return the current Mir 18 crew of Commander Vladimir Dezhurov, Flight Engineer Gennadiy Strekalov and U.S. astronaut and researcher Norm Thagard to Earth. The Mir 18 crew has been aboard the space station since March 16.

While Atlantis is at the Russian space station, the Mir 18 crew will hand over control of the station to the Mir 19 crew, and astronauts will transfer the biomedical samples collected during the previous three months. Shuttle astronauts also will perform a variety of other tests on Thagard, Dezhurov and Strekalov with the unique instruments that will be housed in Atlantis' Spacelab module.

-more-

The scientific investigations for STS-71 are part of the Shuttle-Mir Medical Project which is designed to collect data on the human body's adaptation to long-duration space flight. The project is composed of 28 investigations in seven different categories: metabolism; cardiovascular and pulmonary systems; neuroscience; hygiene, sanitation, and radiation; behavior and performance; fundamental biology and microgravity science.

The STS-71 pre-flight briefings will originate from the Johnson Space Center with two-way question and answer capability available at all participating NASA Centers.

Following the traditional crew news conference, the STS-71 crew members will participate in one-on-one round-robin interviews. Those wishing to participate in the round-robins should contact Eileen Hawley at 713/483-5111 before May 30.

The briefing schedule is as follows: (All times are Central)

June 1, 1995

- 8 a.m. Phase One Overview
Tommy Holloway, Manager, Phase One Program Office
Frank Culbertson, Deputy Manager, Phase One Program Office
- 9 a.m. Mission Overview
Bob Castle, STS-71 Lead Flight Director
Lynda Gavin, STS-71 Lead Rendezvous Officer
- 1 p.m. Mission Science Overview
Dr. Tom Sullivan, Spacelab-Mir Mission Scientist
Dr. John Charles, Investigator, Cardiovascular Studies
Dr. Helen Lane, Investigator, Metabolic Studies
Dr. Bill Polaski, Investigator, Neuroscience Studies
- 2 p.m. Orbiter Docking System Overview
Dave Hamilton, Docking System Project Manager
John McManamen, Chief Engineer, Docking Mechanism

June 2, 1995

- 1 p.m. STS-71 Crew News Conference
(Translation will be provided)
Robert L. "Hoot" Gibson, Commander
Charlie Precourt, Pilot
Ellen Baker, Mission Specialist 1
Greg Harbaugh, Mission Specialist 2
Bonnie Dunbar, Mission Specialist 3
Anatoly Solovyev, Mir 19 Commander
Nikolai Budarin, Mir 19 Flight Engineer

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June 2, 1995

3 - 6 p.m. Crew Round Robin Interviews
(Translation will be provided)

NASA Television will carry all briefings, except the round-robin interviews, live on Spacenet 2, Transponder 5, Channel 9 at 69 degrees West longitude. The transponder frequency is 3880 MHz and the audio subcarrier is 6.8 MHz. The polarization is horizontal.

- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 22, 1995

VIDEO ADVISORY: V95-71

CONTROLLED SCRUBLAND BURN ON NASA TV TUESDAY

Tuesday's NASA TV video news file will open with a feature on how the U.S. Fish and Wildlife Service, in cooperation with NASA's Kennedy Space Center, FL, conduct controlled scrubland burns around the 140,000 acre facility. Controlled burns of the dense vegetation at Kennedy help prevent larger rogue fires and create a safer environment for wildlife. Following the feature on the controlled burns, NASA TV will re-air a recent image from the Hubble Space Telescope. The Hubble recently discovered that white dwarf stars, as seen in the heart of two exploded double-star systems, are cooler and spin more slowly than astronomers had expected. The lower than predicted heat level discovered by Hubble is causing astronomers to revise their theories about dwarf stars. Also replayed Tuesday will be a feature and interviews about NASA's "cool suit," a suit designed by NASA researchers to help Multiple Sclerosis sufferers by reducing their body heat. NASA and the National Rehabilitation Hospital, Washington, DC, have been conducting research over the past year to better develop the cool suit to meet the needs of Multiple Sclerosis patients.

Video News File (transmission times: 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Controlled scrubland burns at the Kennedy Space Center, FL</i>	TRT: 6:00
ITEM #2: <i>Hubble probes remnants of stellar explosion</i>	TRT: :38
ITEM #3: <i>Cool suit helps Multiple Sclerosis sufferers</i>	TRT: 1:26
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ITEM #5: <i>Interview with Dr. Laurie Laven</i>	TRT: 2:26

All TRT's are approximate and subject to change.

Public Affairs Contacts

Scrubland burns	Lisa Malone	407/867-2468
Hubble Space Telescope	Don Savage	202/358-1547
Cool Suit	Mike Braukus	202/358-1979

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

May 22, 1995

Tammy Jones
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-5566)

Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

RELEASE: 95-75

HUBBLE PROBES THE WORKINGS OF A STELLAR HYDROGEN-BOMB

Peering into the heart of two recently exploded double-star systems, NASA's Hubble Space Telescope has surprised researchers by finding that the white dwarf stars at the heart of the fireworks are cooler and spin more slowly than expected.

"This calls for revision of theory," said Prof. Edward Sion of Villanova University, Villanova, PA. "Though these extremely faint explosive white dwarfs have been known about for 30 years, Hubble allows astronomers to observe them directly for the first time and provide observational evidence to test theories."

Each dwarf -- incredibly dense, burned-out stars that have collapsed to the size of Earth -- is in a compact binary system, called a cataclysmic variable, where its companion is a normal star similar to but smaller than the Sun. The stars orbit each other in less than three hours and are so close together the entire binary system would fit inside Earth's Sun. This allows gas to flow from the normal star onto the dwarf where it swirls into a pancake-shaped disk.

When the disk of gas periodically collapses onto the white dwarf, it unleashes a burst of kinetic energy, called a dwarf nova outburst, equivalent to 100 million times the explosive energy of all the warheads which were in U.S. and Soviet arsenals at the peak of the Cold War. Once dumped onto the dwarf's surface, hydrogen accumulates until it undergoes thermonuclear fusion reactions that eventually trigger the classical nova explosion, which is 10,000 times more energetic than the dwarf nova outburst. After the detonation the "fueling" of the white dwarf starts again.

- more -

Sion and co-investigators studied the two best known cataclysmic variables, VW Hydri, and U Geminorum. Hubble was used to make spectroscopic observations of the dwarf novae just days after their eruption, before another gas disk formed and obscured direct observation of the white dwarf.

The biggest surprise is that the spin rates of the white dwarf stars, as measured by Hubble (slightly less than four minutes for U Geminorum, and approximately once a minute for VW Hydri) are so slow there should be violent collisions where the gas disk crashes onto the slower moving white dwarf surface. Since the predicted x-rays from the hot (several hundred thousand to a million degrees Celsius, or greater) colliding gas has never been observed, astronomers thought that the white dwarf was spinning as fast as the disk, so that contact between the disk and surface was less violent. However, the Hubble results contradict this conclusion.

"Despite the fact that several million years of accumulating the swirling gas disks should spin-up the white dwarfs, we just don't see it," said Sion. "Perhaps other mechanisms might be at work to carry away rotational momentum, removing the spin."

Their Hubble observations have also provided the first direct measurements of the cooling of the white dwarfs in response to the heating by the dwarf nova explosion. The researchers found that, even though the gaseous disk heats the white dwarf star surfaces by thousands of degrees Kelvin, this is still well below the predicted heating, according to standard theory.

"Somehow this energy is dissipated across the dwarf's surface, rather than being concentrated at the zone where the disk crashes," said Sion.

The Hubble results also show that the proportion of chemical elements in the dwarfs' atmospheres is significantly different from the observed proportions in the Sun's atmosphere. This is probably due to the fact that heavier elements falling onto the dwarf are pulled quickly below the surface layers by the dwarf's enormous gravitational field and turbulence associated with the accumulation of the gas disk.

Further Hubble observations by the team during 1995-96 will attempt to resolve these mysteries. Their work appears in the May 10 and May 20 issues of the *Astrophysical Journal Letters*. The research team includes E.M. Sion and Min Huang, Villanova University; Paula Szkody, University of Washington; Ivan Hubeny, NASA Goddard Space Flight Center, Greenbelt, MD.; and Fuhua Cheng, University of Maryland.

The Space Telescope Science Institute is operated by AURA (the Association of Universities for Research in Astronomy, Inc.) for NASA, under contract with the Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

-3-

NOTE TO EDITORS: Images and a video depicting this event are available to media representatives by calling NASA's Broadcast & Imaging Branch at 202/358-1900. NASA photo numbers are: Color - 93-HC-375; B&W - 93-H-401.

Artist conception can be accessed on the Internet:

Image files in GIF and JPEG format may be accessed on Internet via anonymous ftp from ftp.stsci.edu in /pubinfo:

GIF: /pubinfo/gif/DiskIllus.gif

JPEG: /pubinfo/jpeg/DiskIllus.jpg

The same images are available via World Wide Web from URL
<http://www.stsci.edu/Latest.html>, or via links in
<http://www.stsci.edu/public.html>.

-end-

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Internet Advisory



National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

For Release

May 23, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

INTERNET ADVISORY: 195-7

SPACE SHUTTLE DISCOVERY MISSION PRESS KIT AVAILABLE ON INTERNET

The press kit for the next Space Shuttle Mission, which marks the 100th American human space mission, is now available over the Internet.

The Space Shuttle Discovery is scheduled to launch June 8 at 9:01 a.m. EDT on a mission to carry into space and deploy a new Tracking and Data Relay Satellite (designated TDRS-G). The satellite will supplement NASA's existing communications network that supports tracking, telemetry, data acquisition and command services essential to Space Shuttle operations and low-Earth orbital spacecraft missions.

"STS-70_PRESS_KIT.txt," is available over the Internet using Fetch or similar software at:

FTP.HQ.NASA.GOV
in the PUB/PAO/PRESSKIT/1995 directory as **STS-70_PRESS_KIT.txt**

or via the World Wide Web at the Headquarters Newsroom Homepage at URL:

<http://www.nasa.gov/hqpao/newsroom.html>

in the Press Kit 1995 folder as **"STS-70_PRESS_KIT.txt"**

NASA Television will provide continuous live coverage during Discovery's flight. NASA TV is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to 202/358-4043. Press releases and other information also are available via FTP at: FTP.HQ.NASA.GOV in the PUB/PAO directory.

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 23, 1995

VIDEO ADVISORY: V95-72

REPLAY OF GOES-J WEATHER SATELLITE LAUNCH ON NTV WEDNESDAY

Wednesday's NASA TV video news file will open with a replay of launch of the GOES-J weather satellite. GOES-J was launched at 1:52 a.m. EDT Tuesday morning from the Kennedy Space Center, FL. The satellite is one of two orbiting weather satellites that will help meteorologists predict adverse weather conditions as they develop in the atmosphere. Following the launch footage, the video news file will re-air a feature on how the U.S. Fish and Wildlife Service, in cooperation with NASA's Kennedy Space Center, FL, conducts controlled scrubland burns around the 140,000 acre facility. Controlled burns of the dense vegetation at Kennedy help prevent larger rogue fires and create a safer environment for wildlife. Following the feature on the controlled burns, NASA TV will re-air a recent image from the Hubble Space Telescope. The Hubble has discovered that white dwarf stars, as seen in the heart of two exploded double-star systems, are cooler and spin more slowly than astronomers had expected. The lower than predicted heat level discovered by Hubble is causing astronomers to revise their theories about dwarf stars. Also replayed Wednesday will be a feature and interviews about NASA's "cool suit," a suit designed by NASA researchers to help Multiple Sclerosis sufferers by reducing their body heat. NASA and the National Rehabilitation Hospital, Washington, DC, have been conducting research over the past year to better develop the cool suit to meet the needs of Multiple Sclerosis patients.

Video News File (transmission times: 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay of GOES-J launch at the Kennedy Space Center, FL</i>	TRT: 6:00
ITEM #2: <i>Controlled scrubland burns at the Kennedy Space Center, FL</i>	TRT: 6:00
ITEM #3: <i>Hubble probes remnants of stellar explosion</i>	TRT: :38
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Public Affairs Contacts

GOES-J, scrubland burns	Lisa Malone	407/867-2468
Hubble Space Telescope	Don Savage	202/358-1547
Cool suit	Mike Braukus	202/358-1979

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-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

May 24, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-73

STS-71 CREW PREFLIGHT REMARKS REPLAYED ON NTV THURSDAY

Thursday's NASA TV video news file will open with a replay of a remarks by members of the STS-71 mission crew who were available to talk with reporters on Wednesday from the launch site of the upcoming mission. STS-71 will mark a major milestone in cooperation between the Russian and American space programs when Space Shuttle Atlantis docks with the Mir space station in late June. Following the STS-71 crew briefing replay, NASA TV will re-air footage of the GOES-J launch which occurred early Tuesday morning at the Kennedy Space Center. The satellite is one of two orbiting weather satellites that will help meteorologists predict adverse weather conditions as they develop in the atmosphere. Following the launch footage, the video news file will re-air a feature on how the U.S. Fish and Wildlife Service, in cooperation with NASA's Kennedy Space Center, FL, conducts controlled scrubland burns around the 140,000 acre facility. Controlled burns of the dense vegetation at Kennedy help prevent larger rogue fires and create a safer environment for wildlife. Following the feature on the controlled burns, NASA TV will re-air a recent image from the Hubble Space Telescope. The Hubble has discovered that white dwarf stars, as seen in the heart of two exploded double-star systems, are cooler and spin more slowly than astronomers had expected. The lower than predicted heat level discovered by Hubble is causing astronomers to revise their theories about dwarf stars. Also replayed Thursday will be a feature and interviews about NASA's "cool suit," a suit designed by NASA researchers to help Multiple Sclerosis sufferers by reducing their body heat. NASA and the National Rehabilitation Hospital, Washington, DC, have been conducting research over the past year to better develop the cool suit to meet the needs of Multiple Sclerosis patients.

Video News File (transmission times: 3 p.m., 6 p.m. and 9 p.m. EDT)

ITEM #1: <i>Replay of STS-71 crew comments from the Kennedy Space Center, FL</i>	TRT: TBD
ITEM #2: <i>Replay of GOES-J launch at the Kennedy Space Center, FL</i>	TRT: 6:00
ITEM #3: <i>Controlled scrubland burns at the Kennedy Space Center, FL</i>	TRT: 6:00
ITEM #4: <i>Hubble probes remnants of stellar explosion</i>	TRT: :38
ITEM #5: <i>Cool suit helps Multiple Sclerosis sufferers</i>	TRT: 1:26
ITEM #6: <i>Interview with Kristen Kauffman about the cool suit</i>	TRT: 2:25
ITEM #7: <i>Interview with Dr. Laurie Laven</i>	TRT: 2:26

All TRT's are approximate and subject to change.

Public Affairs Contacts

STS-71 crew, GOES-J, scrubland burns	Lisa Malone	407/867-2468
Hubble Space Telescope	Don Savage	202/358-1547
Cool suit	Mike Braukus	202/358-1979

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-end-

Launius, Roger

From: NASANews
To: press-release-nasa
Subject: Lockheed Chosen for Life Sciences Contract at Ames
Date: Thursday, May 25, 1995 4:47PM

Michael Braukus
Headquarters, Washington, DC
(Phone: 202-358-1979)

May 25, 1995

Ann Hutchison
Ames Research Center, Mountain View, CA
(Phone: 415/604-4968)

RELEASE: c95-g

LOCKHEED CHOSEN FOR LIFE SCIENCES CONTRACT AT AMES

NASA has selected Lockheed Engineering and Sciences Co., Houston, for a \$314 million five-year contract to provide engineering and technical support for life sciences programs at NASA's Ames Research Center, Mountain View, CA.

The cost-plus-award-fee contract, which begins July 1, includes a one-year base period followed by four one-year options. It also includes options for additional level of effort, materials and other subcontracted services.

Under the contract, Lockheed will provide support to Ames in the areas of life sciences research, advanced life support research and technology development, flight payloads development, payload operations, the Gravitational Biology Facility project and the Centrifuge Facility Project.

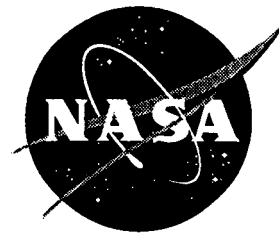
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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

May 25, 1995

Tammy Jones
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-5566)

RELEASE: C95-h

CTA SELECTED TO NEGOTIATE \$77 MILLION CONTRACT

NASA has selected CTA Inc. of Rockville, MD, to negotiate a \$77 million contract for Special Payloads Development at the Goddard Space Flight Center, Greenbelt, MD.

The cost-plus-award-fee contract is for one year, with options that could go to five years. The contract will provide:

- mechanical, structural, and electronic engineering design and analysis;
- mission and/or system analysis;
- software development and maintenance;
- configuration management, documentation, fabrication, assembly, integration and qualification testing;
- launch, operational, and field support;
- equipment maintenance and modifications; and
- related performance assurance activities for aerospace systems, subsystems and components utilized by Goddard, including but not limited to the Small Explorer, Shuttle Small Payloads (e.g. Hitchhiker, Get Away Special) and Spartan projects.

The contract is expected to take effect July 1, 1995.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

May 26, 1995

Brian Welch
Headquarters, Washington, DC
(Phone: 202/358-1600)

NOTE TO EDITORS: N95-32

GOLDIN TO DISCUSS NATIONAL R & D INVESTMENT

NASA Administrator Daniel S. Goldin will discuss the criticality of research and development funding at a conference of the National Research Council Board on Science, Technology and Economic Policy at 8:30 a.m. EDT Wednesday, May 31, at the National Academy of Sciences in Washington, DC.

Goldin has been asked to speak on the topic of "Research, Economic Growth and Competitiveness" and will call for a national debate on American technology investment for the 21st century. During his speech, he will challenge government, industry and academia to forge a stronger partnership to ensure America's continuing leadership role in scientific research and technology development.

Having recently outlined a plan for restructuring NASA that cuts infrastructure and overhead costs without adversely impacting research and development, Goldin will make a case for NASA's continuing relevance and reiterate NASA's resolve to remain a world leader in exploration and advanced technologies.

The National Academy of Sciences is located at 2101 Constitution Avenue, NW. Goldin's speech will be delivered in the Lecture Room.

- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

May 25, 1995

VIDEO ADVISORY: V95-74

ASTRONAUT TRAINING IN RUSSIA, RUSSIAN ROCKET LAUNCH ON NTV

Friday's NASA Television video news file will feature new footage of American astronauts training in Russia, and the launch of a Russian rocket carrying a science payload to the Mir space station. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: *American astronauts flying high in Russia*

TRT: 4:00

American astronauts Shannon Lucid and John Blaha shown simulating zero-gravity flight aboard a Russian IL-76 aircraft. Lucid is scheduled to fly on the STS-76 mission next March to become part of the Mir 21 crew. Blaha is scheduled to join the Mir crew when he flies aboard STS-81.

ITEM #2: *Science module launched on Russian rocket*

TRT: 3:00

Russian Space Agency footage from May 20th showing the launch of the Spectr science module on a Russian Proton booster. The Spectr module is expected to dock with the Mir space station next Wednesday evening.

The video news file also will replay the following features Friday:

ITEM #3: *REPLAY -- Mir docking crew arrives at the Kennedy Space Center* TRT: 2:45

ITEM #4: *REPLAY -- Press conference with Atlantis crew* TRT: 21:25

Public Affairs Contacts

Astronaut training in Russia, Spectr launch
STS-71 crew

Rob Navias
Lisa Malone

713/483-5111
407/867-2468

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NewsRelease

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

For Release

May 26, 1995

Lisa Malone
Kennedy Space Center, FL
(Phone: 407/867-2468)

RELEASE: 95-76

NASA SETS JUNE 8 AS LAUNCH DATE FOR 100TH HUMAN SPACE MISSION

NASA managers today set June 8, 1995, as the official launch date for Space Shuttle Discovery on the STS-70 mission. The STS-70 mission achieves a unique milestone in the history of the American space program as it will mark the 100th human space mission flown by the United States, a record that began with Alan B. Shepherd's historic 15-minute suborbital flight into space in 1961. The primary objective of the STS-70 mission is the deployment of the Tracking and Data Relay Satellite-G, the last in a series for a space-based satellite network that provides communication, tracking, telemetry, data acquisition and command services essential to Shuttle and low-Earth orbital spacecraft missions.

Discovery and the STS-70 crew are scheduled to be launched into a 160-mile circular orbit during a two-hour 30 minute window which opens at 9:26 a.m. EDT on June 8. The mission is scheduled for seven days, 22 hours and 10 minutes but Shuttle officials may shorten the flight to five days depending on when the mission actually begins so that the next Shuttle mission - a historic link up with the Russian space station Mir - can be launched on or about June 22. An ontime STS-70 launch and full eight-day mission would result in a June 16 landing at the Kennedy Space Center at 7:36 a.m. EDT.

Aboard Discovery will be a five-person crew commanded by two-time Shuttle pilot Terence (Tom) Henricks, pilot Kevin Kregel and mission specialists Donald Thomas (second flight), Nancy Curie (second flight) and Mary Ellen Weber. This will be Kregel and Weber's first space voyage.

- end -

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95-77

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE MISSION STS-71

PRESS KIT
JUNE 1995



SHUTTLE MIR MISSION - 1

For Information on the Space Shuttle

Ed Campion Headquarters, Wash., DC	Policy/Management	202/358-1778
Rob Navias Johnson Space Center, Houston	Mission Operations Astronauts	713/483-5111
Bruce Buckingham Kennedy Space Center, FL	Launch Processing KSC Landing Information	407/867-2468
June Malone Marshall Space Flight Center, Huntsville, AL	External Tank/SRBs/SSMEs	205/544-0034
Cam Martin Dryden Flight Research Center, Edwards, CA	DFRC Landing Information	805/258-3448

For Information on STS-71 Experiments & Activities

Rob Navias Johnson Space Center, Houston	Mir Rendezvous & Docking	713/483-5111
Debra Rahn Headquarters, Wash., DC	International Cooperation	202/358-1639
Mike Braukus Headquarters, Wash., DC	Shuttle/Mir Science Operations	202/358-1979

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RELEASE: 95-77

SHUTTLE AND SPACE STATION MIR SET FOR HISTORIC LINK-UP

Twenty years after the world's two greatest spacefaring nations and Cold War adversaries staged a dramatic link-up between piloted spacecraft, the space programs of the United States and Russia will again meet in Earth orbit when Space Shuttle Atlantis docks to the Mir Space Station in June. "This flight heralds a new era of friendship and cooperation between our two countries," said NASA Administrator Daniel S. Goldin. "It will lay the foundation for construction of an international Space Station later this decade."

This flight also will mark America's 100th human space mission. (See chronology of American human space flights on page 45).

The STS-71 mission is the first of seven planned Space Shuttle-Mir link-ups between 1995 and 1997, including rendezvous, docking and crew transfers, which will pave the way toward assembly of the international Space Station beginning in November 1997.

The STS-71 crew will be commanded by Robert L. "Hoot" Gibson who will be making his fifth Shuttle flight. Charles J. Precourt will serve as pilot and will be making his second space flight. The three STS-71 mission specialists aboard Atlantis will include Ellen S. Baker, Mission Specialist-1, who will be making her third flight, Gregory J. Harbaugh, Mission Specialist-2, who will be making his third flight and Bonnie Dunbar, Mission Specialist-3, who will be making her fourth space flight.

Also aboard Atlantis will be Cosmonauts Anatoly Y. Solovyev, making his fourth space flight, and Nikolai M. Budarin, making his first flight. Solovyev and Budarin are designated as the Mir 19 crew and will remain aboard Mir when Atlantis undocks from the nine-year old space station and returns to Earth with the Mir 18 crew.

Launch of Atlantis on the STS-71 mission is currently targeted for June 23, 1995 at approximately 5:06 p.m. EDT from Kennedy Space Center's Launch Complex 39-A. The actual launch time may vary by a few minutes based on calculations of Mir's precise location in space at the time of liftoff due to Shuttle rendezvous phasing requirements. The available launch period, or "window" to launch Atlantis, is approximately five minutes each day.

The STS-71 mission is scheduled to last 10 days, 19 hours, 31 minutes. A 5:06 p.m. launch on June 23 would be followed by a landing at Kennedy Space Center's Shuttle Landing Facility on July 4 at 12:37 p.m. EDT.

STS-71's rendezvous and docking with the Mir actually begins with the precisely timed launch of Atlantis setting it on a course for rendezvous with the Mir station. Over the next two days, periodic firings of Atlantis' small thruster engines will gradually bring the Shuttle to closer proximity to Mir.

Unlike most rendezvous procedures that typically have the Shuttle approaching from directly in front of its target, Atlantis will aim for a point directly below Mir, along the Earth radius vector (R-Bar), an imaginary line drawn between the Mir center of gravity and the center of Earth. Approaching along the R-Bar, from directly underneath the Mir, allows natural forces to brake Atlantis' approach more than would occur along a standard Shuttle approach from directly in front of Mir. The R-Bar approach also reduces the small number of jet firings close to the Mir avoiding damage or contamination of its electricity-producing solar panels.

Joint scientific investigations will be carried out inside the Spacelab module tucked in Atlantis' large cargo bay. These investigations will provide more knowledge about the human body and the microgravity environment. Research in seven different medical and scientific disciplines, begun during Mir 18, will conclude on STS-71. Of the 28 experiments being conducted as part of the joint U.S.-Russian cooperative effort, 15 will be performed as part of the STS-71 mission.

The experiments take advantage of the unique microgravity environment, which separates the effects of gravity from the effects of physiologic change occurring from other causes. Researchers will not only enhance knowledge about spaceflight-induced physiologic changes, but also advance understanding of such Earth-based conditions as anemia, high blood pressure, osteoporosis, kidney stones, balance disorders and immune deficiencies.

At the end of joint docked activities, Solovyev and Budarin will assume responsibility for operations of the Mir station. The Mir-18 crew who have been aboard the station since March 16, are Commander Vladimir Dezhurov, Flight Engineer Gennady Strekalov and Cosmonaut Researcher and American astronaut Norm Thagard. They will join the STS-71 crew for the return trip to Earth. Thagard will return home with the American record for a single space flight with more than 100 days in space. The previous record was held by the Skylab-4 crew with 84 days in 1973-1974. Thagard broke the record June 6, 1995.

-end of general release-

Media Services Information

NASA Television Transmission

NASA television is available through the Spacenet-2 satellite system. Spacenet-2 is located on Transponder 5, at 69 degrees West longitude; frequency 3880.0 MHz, audio 6.8 MHz.

The schedule for television transmissions from the orbiter and for mission briefings will be available during the mission at Kennedy Space Center, FL; Marshall Space Flight Center, Huntsville, AL; Dryden Flight Research Center, Edwards, CA; Johnson Space Center, Houston, and NASA Headquarters, Washington, DC. The television schedule will be updated to reflect changes dictated by mission operations.

Television schedules also may be obtained by calling COMSTOR 713/483-5817. COMSTOR is a computer data base service requiring the use of a telephone modem. A voice update of the television schedule is updated daily at noon Eastern time.

Status Reports

Status reports on countdown and mission progress, on-orbit activities and landing operations will be produced by the appropriate NASA newscenter.

Briefings

A mission press briefing schedule will be issued prior to launch. During the mission, status briefings by a Flight Director or Mission Operations representative and when appropriate, representatives from the payload team, will occur at least once each day. The updated NASA television schedule will indicate when mission briefings are planned.

Internet Information

The NASA Headquarters Public Affairs Internet Home Page provides access to the STS-71 mission press kit and status reports. The address for the Headquarters Public Affairs Home Page is:

http://www.nasa.gov/hqpao/hqpao_home.html.

Informational materials, such as status reports and TV schedules, also are available from an anonymous FTP (File Transfer Protocol) server at **<ftp.hq.nasa.gov/pub/pao>**. Users should log on with the user name "anonymous" (no quotes), then enter their e-mail address as the password. Within the /pub/pao directory there will be a "readme.txt" file explaining the directory structure.

Pre-launch status reports from KSC are found under **ftp.hq.nasa.gov/pub/pao/statrpt/ksc**, and mission status reports can be found under **ftp.hq.nasa.gov/pub/pao/statrpt/jsc**. Daily TV schedules can be found under **ftp.hq.nasa.gov/pub/pao/statrpt/jsc/tvsked**.

Access by fax

An additional service known as fax-on-demand will enable users to access NASA informational materials from their fax machines. Users calling (202) 358-3976 may follow a series of prompts and will automatically be faxed the most recent Headquarters news releases they request.

Access by Compuserve

Users with Compuserve accounts can access NASA press releases by typing "GO NASA" (no quotes) and making a selection from the categories offered.

STS-71 Quick Look

Launch Date/Site: June 23, 1995 /Launch Pad 39A
Launch Time: 5:06 p.m. EDT
Launch Window: 5 minutes
Orbiter: Atlantis (OV-104), 14th flight
Orbit/Inclination: 213 nautical miles/51.6 degrees
Mission Duration: 10 days, 19 hours, 31 minutes
Landing Date: July 4, 1995
Landing Time: 12:37 p.m. EDT
Primary Landing Site: Kennedy Space Center, Florida
Abort Landing Sites: Return to Launch Site - KSC
Transoceanic Abort Landing - Zaragoza, Spain
Ben Guerir, Morocco,
Moron, Spain
Abort Once Around - Kennedy Space Center

Crew: Robert Hoot Gibson, Commander (CDR)
Charlie Precourt, Pilot (PLT)
Ellen Baker, Mission Specialist 1 (MS 1)
Greg Harbaugh, Mission Specialist 2 (MS 2)
Bonnie Dunbar, Mission Specialist 3 (MS 3)
Anatoly Solovyev, Mir 19 Commander (Ascent only)
Nikolai Budarin, Mir 19 Flight Engineer (Ascent only)
Vladimir Dezhurov, Mir 18 Commander (Entry only)
Gennady Strekalov, Mir 18 Flight Engineer (Entry only)
Norm Thagard, Mir 18 Cosmonaut-Researcher (Entry only)

EVA Crewmembers: Harbaugh (EV 1), Baker (EV 2)

Cargo Bay Payloads: Spacelab-Mir
Orbiter Docking System

Middeck Payloads: IMAX

In-Cabin Payloads SAREX-II:

Developmental Test Objectives/ Detailed Supplementary Objectives:

DTO 301D:	Ascent Structural Capability Evaluation
DTO 307D:	Entry Structural Capability
DTO 312:	External Tank Thermal Protection System Performance
DTO 414:	APU Shutdown Test
DTO 624:	Radiator Performance
DTO 656:	PGSC Single Event Upset Monitoring Configuration
DTO 700-10:	Orbiter Space Vision System Flight Video Taping
DTO 805:	Crosswind Landing Performance
DTO 832:	Target of Opportunity Navigation Sensors
DTO 1118:	Photographic and Video Survey of Mir Space Station
DTO 1120:	Mated Shuttle and Mir Free Drift Experiment
DSO 487:	Immunological Assessment of Crewmembers
DSO 608:	Effects of Spaceflight on Aerobic and Anaerobic Metabolism
DSO 614:	The Effect of Prolonged Spaceflight on Head and Gaze Stability during Locomotion
DSO 624:	Pre and Postflight Measurement of Cardiorespiratory Responses to Submaximal Exercise
DSO 901:	Documentary Television
DSO 902:	Documentary Motion Picture Photography
DSO 903:	Documentary Still Photography

Crew Responsibilities

Payloads and Activities	Prime	Backup
Mir Systems and Payloads	Dunbar	
Spacelab Systems	Precourt	Gibson
Spacelab Payloads	Baker	Dunbar
Orbiter Docking System	Harbaugh	Precourt
Rendezvous	Gibson	Precourt
		Harbaugh
Lasers	Harbaugh	Precourt
EVA	Harbaugh, Baker	
IV Crewmember	Precourt	
DTOs/DSOs	Precourt	Gibson
In-Flight Maintenance	Harbaugh	Precourt
Medical Operations	Baker	Gibson
Photography/TV	Harbaugh	Precourt
Earth Observations	Harbaugh	Precourt
SAREX	Precourt	Baker
IMAX	Baker	Gibson
Electronic Still Camera	Baker	

Space Shuttle Abort Modes

Space Shuttle launch abort philosophy aims toward safe and intact recovery of the flight crew, orbiter and its payload. Abort modes for STS-71 include:

- * Abort-To-Orbit (ATO) -- Partial loss of main engine thrust late enough to permit reaching a minimal 105-nautical mile orbit with the orbital maneuvering system engines.

- * Abort-Once-Around (AOA) -- Earlier main engine shutdown with the capability to allow one orbit of the Earth before landing at the Kennedy Space Center, FL.

- * TransAtlantic Abort Landing (TAL) -- Loss of one or more main engines midway through powered flight would force a landing at either Zaragoza, Spain; Ben Guerir, Morocco; or Moron, Spain.

- * Return-To-Launch-Site (RTL) -- Early shutdown of one or more engines, and without enough energy to reach a TAL site, would result in a pitch around and thrust back toward KSC until within gliding distance of the Shuttle Landing Facility.

Payload and Vehicle Weights

Vehicle/Payload	Pounds
Orbiter (Atlantis) empty and 3 SSMEs	172,963
Orbiter Docking Equipment	4,016
Spacelab Module and Transfer Tunnel	1,891
Spacelab Payloads	5,739
IMAX Camera	252
Detailed Test and Supplementary Objectives	18
Shuttle System at SRB Ignition	4,511,749
Orbiter Weight at Landing	214,700

STS-71 Summary Timeline

Flight Day One:

Ascent
OMS-2 Burn
NC 1 Burn

Flight Day Two:

Spacelab Activation
Rendezvous Tool Checkout
Centerline Camera Mounting
NC 2 and 3 Burns

Flight Day Three:

Mir Rendezvous Burns
Mir Docking
Hard Mate
Hatch Opening and Welcoming Ceremony
Mir Safety Briefing
Soyuz Seat Liner Exchanges

Flight Day Four:

Gift Exchange
Joint Science Investigations

Flight Days Five and Six

Joint Science Investigations

Flight Day Seven:

Joint Science Investigations
Joint Crew News Conference
Farewell Ceremony
Off Duty Time

Flight Day Eight:

Atlantis Undocking and Flyaround
Separation Burn

Flight Day Nine

Spacelab Investigations
Pre-Landing
Countermeasures

Flight Day Ten

Spacelab Investigations
Pre-Landing
Countermeasures

Flight Day Eleven:

Pre-Landing
Countermeasures
FCS Checkout
RCS Hot Fire
Spacelab Stow
Cabin Stow
Recumbent Seat Setup

Flight Day 12

Spacelab Deactivation
Deorbit Prep
Deorbit Burn
KSC Landing

STS-71 Orbital Events Summary

EVENT	MET
Launch	0/00:00
OMS-2	0/00:43
Spacelab Activation	0/16:00
TI Burn	1/14:17
Mir Docking	1/17:22
Hard Mate	1/17:36
Hatch Opening, Welcoming	1/18:58
Gift Exchange	2/14:15
Crew News Conference	5/20:09
Farewell Ceremony	5/21:55
Atlantis Undocking and Flyaround	6/16:11
Separation Burn	6/17:30
Deorbit Burn	10/18:26
KSC Landing	10/19:31

U.S./Russian Space Cooperation

The International Space Station Program is Underway

The international Space Station will be the preeminent, permanent orbiting science institute in space. It is being developed and assembled in three phases, each designed to maximize joint space experience and permit early utilization and return on a large joint investment involving 15 nations.

In Phase I, Americans and Russians will work together in laboratories on Mir and the Shuttle. They will conduct joint spacewalks and practice space station assembly by adding new modules to Mir. American astronauts will live and work on Mir for months beside their Russian counterparts, amassing the first U.S. long-duration space experience since Skylab (1973-1974).

International Space Station Phase I began with Russian cosmonaut Sergei Krikalev's flight aboard the Space Shuttle Discovery in February 1994 on STS-60. In February 1995, on the STS-63 mission, Discovery flew around the Russian Mir space station with cosmonaut Vladimir Titov aboard. During the fly around, Discovery stopped 37 feet from Mir -- a rehearsal for the first docking between Space Shuttle Atlantis and Mir in June 1995.

In March 1995, U.S. astronaut Dr. Norman Thagard flew to Mir for a three-month stay with two Russian cosmonauts, arriving there March 16. Thagard and his Russian crew mates will return to Earth aboard Atlantis, which also will deliver a new Russian crew to the Mir station.

Phase I Impact on Phases II and III

The goal of Phase I is to lay the groundwork for international Space Station Phases II and III. Phase II beginning in 1997 will place in orbit a core space station with a U.S. laboratory module, the first dedicated laboratory on the station.

The U.S. laboratory will be put to work during utilization flights beginning in 1999 with Phase III, while assembly continues. Phase III ends when assembly is complete (scheduled for mid-2002). At that time, astronauts and cosmonauts from many countries will commence full time space research on the international Space Station.

Phase I is contributing to the success of Phases II and III in four major areas:

- Americans and Russians are working together on Earth and in space, practicing for the future international Space Station
- Integration of U.S. and Russian hardware, systems, and scientific aims over a long period of time

- Risk reduction-mitigation of potential surprises in operations, spacecraft environment, spacewalks, and hardware exchange
- Early initiation of science and technology research

The Space Station Mir

Mir represents a unique capability -- an operational space station that can be permanently staffed by two or three cosmonauts. Visiting crews have raised Mir's population to six for up to a month.

Mir is the first space station designed for expansion. The 20.4-ton Core Module, Mir's first building block, was launched in February 1986. The Core Module provides basic services (living quarters, life support, power) and scientific research capabilities. It has two axial docking ports, fore and aft, for Soyuz-TM manned transports and automated Progress-M supply ships, plus four radial berthing ports for expansion modules.

To date, the Russians have added three expansion modules to the Mir core:

- **Kvant.** Berthed at the core module's aft axial port in 1987, the module weighs 11 tons and carries telescopes and equipment for attitude control and life support.
- **Kvant 2.** Berthed at a radial port since 1989, the module weighs 19.6 tons and carries an EVA airlock, two solar arrays, and science and life support equipment.
- **Kristall.** Berthed opposite Kvant 2 in 1990, Kristall weighs 19.6 tons and carries two stowable solar arrays, science and technology equipment, and a docking port equipped with a special androgynous docking mechanism designed to receive heavy (up to about 100 tons) spacecraft equipped with the same kind of docking unit. The androgynous unit was originally developed for the Russian Buran Shuttle program. The Russians will move Kristall to a different radial Mir port to make room for the new Spektr module, which was launched on May 20. Atlantis will use the androgynous docking unit on Kristall for the first Shuttle-Mir docking in June 1995.

Three more modules, all carrying U.S. equipment, will be added to Mir in 1995 for international Space Station Phase I:

- **Spektr.** Launched on a Russian Proton rocket from the Baikonur launch center in central Asia, Spektr was lofted into orbit on May 20. The module was berthed at the radial port opposite Kvant 2 after Kristall was moved out of the way. Spektr carries four solar arrays and scientific equipment (including more than 1600 pounds of U.S. equipment).

- **Docking Module.** The module will be launched in the payload bay of Atlantis and berthed at Kristall's androgynous docking port during the STS-74 mission in Fall 1995. The Docking Module will provide clearance for future Shuttle dockings with Mir and will carry two solar arrays -- one Russian and one jointly developed by the U.S. and Russia -- to augment Mir's power supply.
- **Priroda.** Launch on a Russian Proton rocket is scheduled for December 1995. Priroda will berth at the radial port opposite Kristall and will carry microgravity research and Earth observation equipment (including 2,200 pounds of U.S. equipment).

In late 1995, after Priroda is added, Mir will have a mass of more than 100 tons. The station will be made up of seven modules launched separately and brought together in space over 10 years. Experience gained by Russia during Mir assembly provides valuable experience for international Space Station assembly in Phases II and III.

Phase I Shuttle Mission Summaries

STS-60

Launch: Feb. 3, 1994

Landing: Feb. 11, 1994

This mission inaugurated international Space Station Phase I. Veteran Russian cosmonaut Sergei Krikalev served as a mission specialist aboard Discovery. He conducted experiments beside his American colleagues in a Spacehab laboratory module carried in Discovery's payload bay.

STS-63

Launch: Feb. 3, 1995

Landing: Feb. 11, 1995

Discovery maneuvered around Mir and stopped 37 feet from the Kristall module's special androgynous docking unit, which Atlantis will use to dock with Mir on the STS-71 mission. Cosmonauts on Mir and astronauts on Discovery beamed TV images of each other's craft to Earth. Cosmonaut Vladimir Titov served on board Discovery as a mission specialist, performing experiments beside his American colleagues in a Spacehab module in the orbiter's payload bay.

For a time it appeared that minor thruster leaks on Discovery might keep the two craft at a pre-planned contingency rendezvous distance of 400 feet. However, mission control teams and management in Kaliningrad and Houston worked together to determine that the leaks posed no threat to Mir, so the close rendezvous went ahead. The minor problem became a major confidence builder and joint problem-solving experience for later international Space Station phases.

STS-71

Planned launch date: June 23, 1995, 5:06 p.m., EDT

Planned rendezvous date: June 26, 1995

Planned landing date: July 4, 1995, 12:37 p.m., EDT

Atlantis will launch seven crew members -- five U.S. astronauts and two Russian cosmonauts -- and, in its payload bay, a Spacelab module and an Orbiter Docking System for docking with Mir. The Orbiter Docking System is a cylindrical airlock with a Russian-built androgynous docking mechanism on top. The Orbiter Docking System will be carried on all docking missions. For STS-71, Atlantis will dock with an identical androgynous unit on Mir's Kristall module.

The Space Shuttle will be used for the first time to change a space station crew, a task which will become a routine part of its duties in later international Space Station phases. Atlantis will drop off cosmonauts Anatoli Solovyev and Nikolai Budarin, and pick up Gennadi Strekalov, Vladimir Dezhurov, and U.S.

astronaut Norman Thagard for return to Earth. They were launched from Russia in the Soyuz-TM 21 spacecraft on March 14.

Thagard and his Russian colleagues will be completing a three-month stay on Mir. Thagard is the first U.S. astronaut to have a long-duration stay on-orbit since the last U.S. Skylab mission in 1974. In fact, his mission broke the record for time on-orbit for a U.S. astronaut on June 6.

The joint crew will carry out experiments similar to those planned for international Space Station Phases II and III. Atlantis will remain docked to Mir for five days.

STS-74

Planned launch: October 1995

Atlantis will carry the Russian-built Docking Module, which has multi-mission androgynous docking mechanisms at top and bottom. During the flight to Mir, the crew will use the orbiter's Remote Manipulator System robot arm to hoist the Docking Module from the payload bay and berth its bottom androgynous unit atop Atlantis' Orbiter Docking System. Atlantis will then dock to Kristall using the Docking Module's top androgynous unit. After two days, Atlantis will undock from the Docking Module's bottom androgynous unit and leave the Docking Module permanently docked to Kristall, where it will improve clearance between the Shuttle and Mir's solar arrays during subsequent dockings.

Atlantis will deliver water, supplies, and equipment, including two new solar arrays -- one Russian and one jointly-developed -- to upgrade the Mir. It will return to Earth experiment samples, equipment for repair and analysis and products manufactured on the station.

STS-76

Planned launch: March 1996

Atlantis will deliver U.S. astronaut Shannon Lucid to Mir for a three-month stay. The orbiter will carry a Spacehab module in its payload bay and will remain docked to the Russian station for five days. Astronauts Linda Godwin and Rich Clifford will conduct the first U.S. spacewalk outside the Mir to attach four experiments to the station's docking module.

STS-79

Planned launch: August 1996

The Space Shuttle will pick up Lucid for her return to Earth and deliver her replacement, U.S. astronaut Jerry Linenger, to Mir for approximately three months. U.S. astronauts will perform a spacewalk during the five-day docked phase. Atlantis will carry a Spacehab double module.

STS-81

Planned launch: December 1996

Linenger will return to Earth and another astronaut will take up residence on Mir. Two Russians or an American and a Russian will perform U.S. experiments as part of a spacewalk during or after the five-day docked phase. Atlantis will carry a Spacehab double module.

STS-84

Planned launch: May 1997

The astronaut delivered on STS-81 will be picked up and another astronaut dropped off. Atlantis will carry a Spacehab double module and will remain docked to Mir for five days.

STS-86

Planned launch: September 1997

Atlantis will pick up the astronaut dropped off on STS-84 and will deliver a joint U.S.-Russian solar dynamic energy module. As many as two spacewalks by U.S. astronauts and Russian cosmonauts will be needed to deploy the energy module outside Mir. The solar dynamic system will heat a working fluid that will drive a turbine, generating more electricity than current photovoltaic solar arrays. The Mir solar dynamic energy module will test the system for possible use on the international Space Station. In addition, developing the solar dynamic energy module will provide joint engineering experience.

Mir Rendezvous and Docking

STS-71's rendezvous and docking with the Russian space station Mir actually begins with the precisely timed launch of Atlantis on a course for the station. Over the next two days, periodic small engine firings will gradually bring Atlantis to a point eight nautical miles behind Mir. At that time, on the third day of the flight, a Terminal Phase Initiation (TI) burn will be fired, and the final phase of the rendezvous will begin. Atlantis will close the final eight nautical miles to Mir during the next 90-minute orbit.

As Atlantis moves in, the Shuttle's rendezvous radar system will begin tracking Mir and providing range and closing rate information to the Shuttle crew. As Atlantis nears Mir, the Trajectory Control Sensor, a laser ranging device mounted in the payload bay, will supplement the Shuttle's onboard navigation information by supplying additional data on the range and closing rate.

As Atlantis closes the final eight nautical miles, the Shuttle will have the opportunity for four small successive engine firings to fine-tune its approach using its onboard navigation information. Unlike most Shuttle rendezvous procedures, Atlantis will aim for a point directly below Mir, along the Earth radius vector (R-Bar), an imaginary line drawn between the Mir center of gravity and the center of Earth.

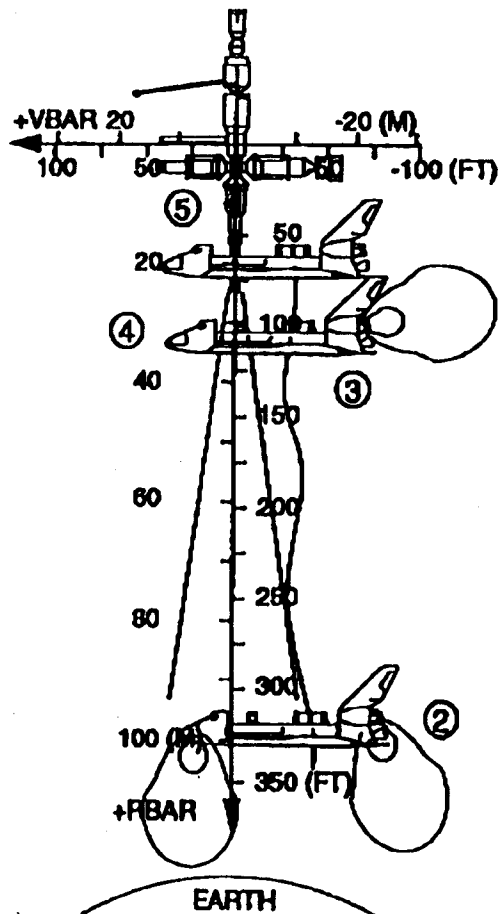
Approaching along the R-Bar, from directly underneath the Mir, allows natural forces to brake the approach more than would occur along a standard Shuttle approach from directly in front of Mir. The R-Bar approach also reduces the small number of jet firings close to the Mir's solar panels. The manual phase of the rendezvous will begin just as Atlantis reaches a point about a half-mile below Mir when Commander Gibson takes the controls. Gibson will fly the Shuttle using the aft flight deck controls as Atlantis begins moving up toward Mir.

Because of the approach from underneath Mir along the R-bar, Gibson will have to perform very few braking firings. However, if such firings are required, the Shuttle's jets will be used in a mode called Low-Z, a technique that uses slightly offset jets on Atlantis' nose and tail to slow the spacecraft rather than firing jets pointed directly at Mir. This technique avoids contamination of the space station by exhaust from the Shuttle steering jets.

Using a centerline camera fixed within the docking system in the payload bay, Gibson will center the Shuttle's docking mechanism with the Mir docking device on the end of the Kristall science module, continually refining this alignment as he approaches to within 300 feet of the station. If necessary, Gibson will then realign Atlantis by rotating the Shuttle to the correct orientation for docking. A 90-degree yaw maneuver of Atlantis may be required.

RBAR CORRIDOR APPROACH FROM 270 FT TO DOCKING

SHUTTLE NOSE IN-PLANE (SNIP)
RBAR APPROACH
 $|\alpha| < 30^\circ$, SPEKTR PRESENT

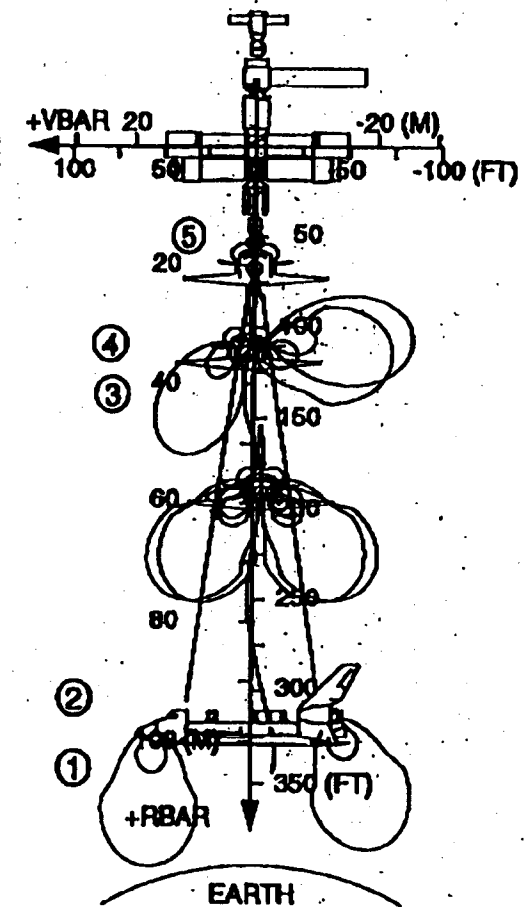


MIR-CENTERED LVLH FRAME

	PET (MM:SS)	R (FT) (M)	EVENT
1	-48:00	270 80	PERFORM SNOOPY MNVR ($ \alpha > 30^\circ$)
2	-38:00	270 80	BEGIN APPROACH
3	-15:00	50 15	COAST TO 30 FT STATIONKEEPING PERFORM ANGULAR ALIGNMENT MNVR
4	-8:00	30 9	RESUME APPROACH RDOT = -0.07 FT/S SWITCH TO NORM Z
5	0:00	0	DOCKING MET = 1/17:26

* - NOTE: $\alpha = \beta$

SHUTTLE NOSE OUT-OF-PLANE
YAW (SNOOPY) RBAR APPROACH
 $|\alpha| > 30^\circ$, WITH/WITHOUT SPEKTR



MIR-CENTERED LVLH FRAME

Plans call for Atlantis to spend 90 minutes station-keeping 250 feet from Mir while flight directors in Houston and at the Russian Mission Control Center outside Moscow review the status of their respective vehicles.

Once a "go" is given for the final approach, Gibson will maneuver Atlantis at a rate of 0.1 feet per second until the orbiter is just 30 feet away. During the station-keeping period and the final approach, Gibson will radio the Mir crew by ship-to-ship communications, providing Shuttle status and keeping them informed of major events from that point on, including confirmation of contact, capture and conclusion of damping. Damping, the halt of any relative motion between the spacecraft after docking, is performed by springs within the docking device.

Undocking, Separation and Mir Fly Around

After over 100 hours of docked operations, the hatches will be closed on both Atlantis and the Mir, and the vestibule in the Shuttle's docking system will be depressurized. The initial separation will be performed by springs that will slightly push the Shuttle and the Mir away from each other on a command sent to the docking mechanism from an aft flight deck control panel in Atlantis. Both the Mir and Atlantis will be in a mode called "free drift" during the undocking, a mode that has the steering jets of each spacecraft shut off to avoid any inadvertent firings.

Once the docking mechanism springs have pushed Atlantis away to a distance of about two feet from Mir, the docking devices will be clear of one another, and Gibson will turn Atlantis' steering jets back on. He will immediately lightly fire the Shuttle's jets in the Low-Z mode to begin very slowly moving away from Mir.

Atlantis will move away from Mir to a distance of about 400 feet, where Gibson will begin a fly around of the station. At that distance, Atlantis will circle Mir a little more than one-and-a-half times to gather detailed engineering pictures and video of the space station before firing its jets again to conclude the joint mission.

Orbiter Docking System

Atlantis and Mir will be linked by an orbiter docking system, jointly developed by Rockwell's Space Systems Division, Downey, CA, and RSC Energia, Kaliningrad, Russia, under a July 1992 modification to an existing Rockwell-NASA JSC Shuttle contract.

The \$95.2-million orbiter docking system consists of an external airlock, a supporting truss structure, a docking base, avionics required to operate the system, and a 632-pound Russian-built docking mechanism, called the androgynous peripheral assembly system (APAS), which is mounted on top of the airlock and docking base. The APAS was procured under a June 1993 subcontract to RSC Energia.

Atlantis received extensive wiring changes to accommodate the new system, which measures nearly 15 feet wide, 6-1/2 feet long, and 13-1/2 feet high and weighs more than 3,500 pounds. It is installed near the forward end of the orbiter's payload bay and is connected by short tunnels to the existing airlock inside the orbiter's pressurized crew cabin and the pressurized Spacelab module, which is aft of the airlock in the payload bay.

The APAS is a hybrid version of the docking system the Russians used in 1975 for the Apollo-Soyuz Test Project. It differs from its predecessor in several key respects. First, it is much more compact, with an overall external diameter of 60 inches compared to 80 inches on ASTP, although the inner egress tunnel diameter remains approximately the same. Second, the APAS docking mechanism has 12 structural latches, compared to eight on the ASTP. Third, the APAS guide ring and its extend/retract mechanism are packaged inside the egress tunnel rather than being outside of the mechanism as they were on ASTP. Finally, the three guide petals on the APAS point inboard rather than outboard.

Both Atlantis and Mir are equipped with an APAS, which consists of a three-petal androgynous capture ring mounted on six interconnected ball screw shock absorbers, which operate like a sophisticated car suspension system. The absorbers arrest the relative motion of the two vehicles and prevent them from colliding.

When the Shuttle crew is ready to begin the docking maneuver, it places the orbiter's docking mechanism in the active mode, or ready-to-dock configuration. In this configuration, the capture ring is extended outward about 11 inches, and the mechanism's five locking devices, called fixators, are disengaged. The docking system of the target vehicle (Mir), also referred to as the passive vehicle, is in a non-operational, stowed mode.

The orbiter crew's primary visual aid for aligning the docking mechanisms during rendezvous is a television camera mounted inside the airlock of the orbiter docking system. The camera views a target at the center of the Mir mechanism through a window in the upper hatch.

Docking begins when the orbiter is maneuvered to bring the interfaces of the active docking mechanism in contact with Mir's passive mechanism. At this point, the maximum allowable axial rate of approach of the two vehicles is 0.2 foot per second. Minor misalignments of the two mechanisms of up to eight inches and five degrees are corrected as the orbiter interface is displaced and rotated so the capture ring can latch onto the opposing androgynous interface ring. This rotation is produced by the relative velocity of the two vehicles. If the alignments are exceeded, the passive half will not be captured, and the two vehicles will simply separate. Further docking attempts can then be made.

Soft latching occurs when the capture ring alignment is complete and the interfaces are aligned. Each of the petals on Atlantis' APAS is equipped with two capture latches. The capture latch assemblies, which operate independently, grapple body mounts on the Mir APAS. The latches are designed to allow the vehicles to separate safely if only one or two of the latch assemblies engage. Once all the latches engage, all possible axes of rotation between the interfaces are removed, and Mir is captured.

The docking of these two massive vehicles is complicated by the orbiter's large center-of-mass offset from the docking mechanism's longitudinal axis, which significantly reduces the effective mass of the active vehicle at the docking interface, making capture more difficult. The orbiter's momentum provides the force required by the docking mechanism to overcome the relative misalignments between the vehicles at the docking interfaces, and preprogrammed firings of the orbiter's nose and tail thrusters assist in the capture. The center of mass offset also causes relative rotation after contact, which complicates the attenuation process.

Five seconds after capture, dampers designed to reduce relative vehicle motion are activated for 30 seconds. Before the dampers are activated, a load-limiting clutch prevents either vehicle from being overloaded. The dampers are deactivated to allow the dampers to align the vehicles.

After the relative motion of the two vehicles has subsided, the retraction phase of the docking process then begins. During this phase, the latched capture ring and passive vehicle are pulled into the orbiter mechanism. The five engaged fixators make the capture ring rigid and prevent relative vehicle misalignments from accumulating during retraction.

Structural latching occurs at the completion of the capture ring retraction process. Twelve active structural latches located at the structural interface are grouped into two separate activated gangs of six latches each. A passive, immobile hook is located next to each active latch. The Mir mechanism also has these latches and hooks. In the process of structurally latching the orbiter and Mir, latch actuator motors deploy the orbiter's active latches, which hook onto Mir's passive hooks. The actuator drives the first hook directly, and a cable transmits power to the remaining five slave hooks. The hooks are driven beyond the point where the hook is overcenter. The overcenter hooks carry the sealing load, rather than the cables. Mir's active latches could also be used to hook onto the orbiter's

passive hooks as a backup procedure. The entire docking process nominally will be completed in less than one hour. The final portion of the process, after capture, takes approximately 15 minutes.

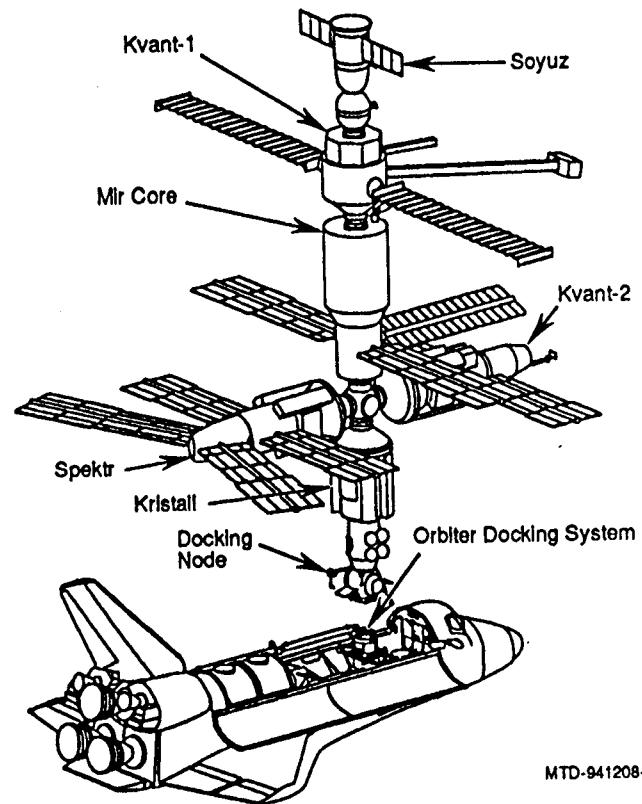
While the vehicles are structurally attached, the orbiter docking system provides a shirt-sleeve environment for transferring crew members and equipment between the orbiter and Mir.

At the end of the mission, the latches are unhooked after the docking base is depressurized, and preloaded separation springs "push" the vehicles apart at low velocity. After it reaches a safe distance from Mir, the orbiter performs a separation maneuver.

The requirement that the ODS be at least dual fault tolerant to allow demating (and subsequent orbiter payload bay door closure) is achieved with two independent (no common cause failure mode) methods. If the primary separation method fails, pyrotechnic charges can be used to shear each of the orbiter's 12 active latch retention bolts and permit the springs to separate the vehicles. Each bolt has redundant power supplies. When fired, the pyrotechnic charges fracture the bolts, allowing the latch hook to rotate about an independent rotation point to release the mating hook. Hook rotation is powered by both the pyrotechnic charge and the off-center force created by the Belleville washers on the mating passive hook. A spring-loaded pin prevents hook rebound.

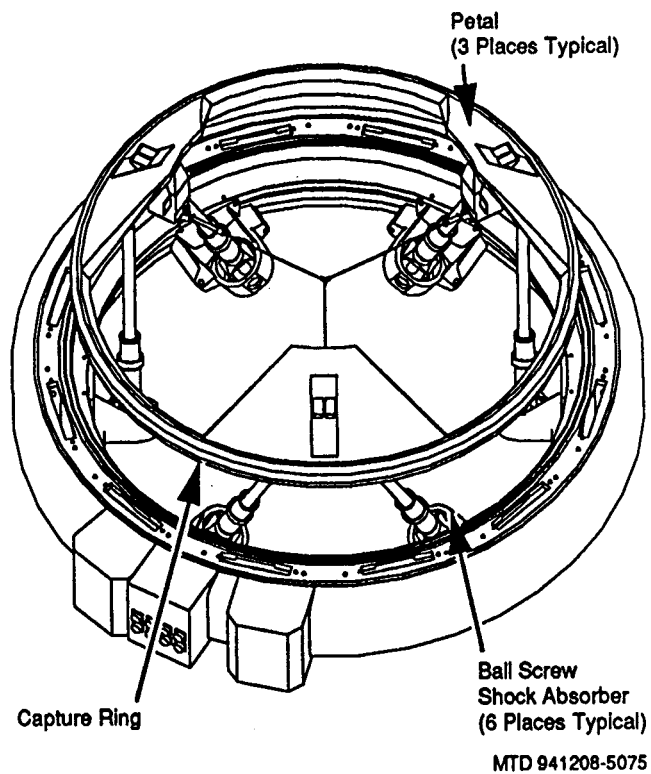
A third method is available if the second also fails. This method requires two astronauts to perform a spacewalk to remove the 96 bolts that hold the docking base on the upper flange of the external airlock. For an EVA to be considered as an option, the station-to-orbiter interface must be rigidized to prevent relative motion between the orbiter and Mir during vehicle attitude control firings. In the EVA procedure, the capture ring would be extended to recapture the Mir, and either the orbiter or the Mir active structural hooks would be engaged to reestablish the interface. The EVA crew would then egress the vehicle and perform the 96-bolt removal procedure.

The Energia docking mechanism design and hardware have undergone extensive testing to develop and qualify the system for the Mir mission. A number of tests were performed in Energia's six-degree-of-freedom test facility to quantify the limits of the mechanism's capture capability. A production unit was subjected to vibration, thermal, and life cycle testing to verify the design. Acceptance tests of the flight unit were conducted to verify the build process. An integrated checkout of the entire system was performed after the orbiter docking system was assembled. Another was performed after it was installed in Atlantis at the Kennedy Space Center. Many firings of the pyrotechnic bolts alone and as part of latch subassemblies were conducted to certify the backup separation system.

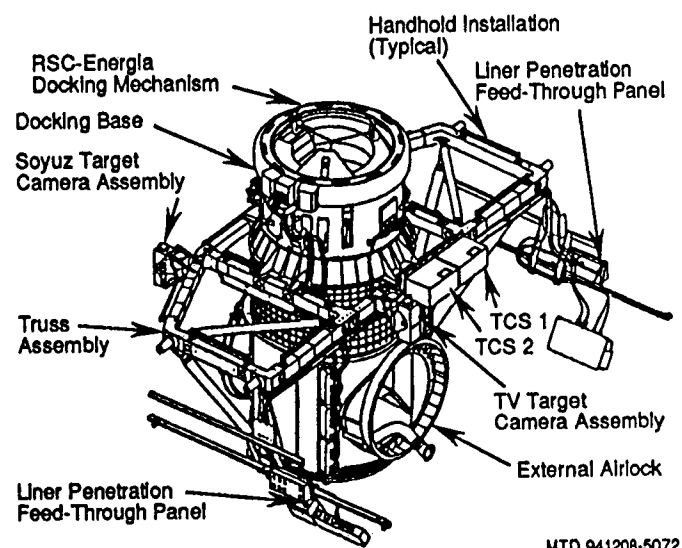


MTD-941208-5073

*Orbiter Docking System Mating
to Mir Space Station*



*Active RSC-Energia Docking Mechanism in
Ready-to-Dock Configuration*



MTD 941208-5072

Orbiter Docking System

Shuttle-Mir Science

Joint scientific investigations by the two premier spacefaring nations continue with the flight of STS-71, the Spacelab-Mir mission, providing more knowledge about the human body and the microgravity environment.

Research in seven different medical and scientific disciplines begun during Mir 18 will conclude on STS-71. Of the 28 experiments being conducted as part of the joint United States-Russian cooperative effort, 15 will be performed as part of the STS-71 mission.

With Atlantis docked to Mir, data and samples collected during the Mir 18 tenure will be transferred to Atlantis for the return trip to Earth. In addition, 11 experiments will remain on Mir to be conducted by the Mir 19 crew.

The metabolic research on STS-71 includes studies of the cardiovascular and pulmonary systems; neurosensory research; hygiene, sanitation, and radiation research; behavior and performance research; fundamental biology research; and microgravity research.

Metabolic Research

Six experiments will examine a wide range of physiologic responses as investigators strive to understand how the body's mechanisms work in space, and how gravity affects the body on Earth.

STS-71 will continue and expand the studies begun on the Mir to study human metabolism and endocrinology and to determine how fluids redistribute themselves in the body, how microgravity affects bone density and red blood cell production. In addition, crew members aboard Atlantis will participate in studies designed to determine if prolonged exposure to microgravity affects the body's ability to mount an antibody response, and whether immune cells are altered by exposure to microgravity.

Cardiovascular and Pulmonary Research

Deconditioning of the cardiovascular and pulmonary system, with the occurrence of orthostatic intolerance (or lightheadedness upon standing) observed in returning crew members of long duration spaceflight is of primary interest to researchers. Researchers will measure changes in blood volume during flight and the pooling of blood in the legs and abdomen upon reentry.

Exercise and the use of both Russian and American lower body negative pressure units will be used as tests and evaluated as countermeasures for their ability to protect those returning crew members. Using a device to mimic increasing and decreasing arterial pressure by applying suction and pressure to the neck, crew members will provide information about heart rate response to this changing pressure stimulus during and after space flight.

The returning Mir 18 crew members will venture back to Earth in a reclining position. The changes in heart rate, blood pressure, voice and posture will be monitored during the reentry portion of STS-71. After landing, they will perform a "stand test" to measure the extent of their orthostatic intolerance following a prolonged stay on orbit.

Neurosensory Research

Investigations begun during Mir 18 focused on the mixed messages the body receives when the brain integrates nerve impulses from the eyes, inner ear, muscles and joints. The brain can no longer rely on gravity as a constant in determining body position and orientation. Two of these studies seek to enhance our understanding of how humans adapt to spaceflight and readapt to Earth's environment.

STS-71 will take a further look at neuromuscular function and muscle deconditioning during extended spaceflights. Crew members will measure muscle tone, strength and endurance by electromyography and utilization of oxygen during treadmill and other exercise.

Hygiene, Sanitation, and Radiation Research

Microgravity is not the only environmental challenge facing spaceflight crews. Recycled air and water, possible microbial contamination, and radiation exposure all must be studied and understood to ensure health in closed living systems.

Two investigations will look at the radiation environment experienced during an extended stay in space, and two others will look at the presence of microbes or trace chemicals found in the air and water consumed by the astronauts.

Microbial samples from both Mir and Atlantis, as well as samples from the astronauts themselves, will be studied to see if microgravity or the characteristics of the closed environment will affect microbial physiology or their interactions with the crew on orbit. Samples of air and water collected during the Mir 18 mission and during STS-71 also will be analyzed for any traces of atmospheric and water contaminants.

Behavior & Performance Research

Data from tests to study the long-term effects of microgravity on muscle coordination and mental acuity, collected during more than three months on Mir 18, will be returned to Earth aboard Atlantis. A Russian spacecraft control simulator used before, during and after flight, will allow researchers to measure crew member's functional state and manual control performance.

Fundamental Biology Research

Microgravity will be used as a research tool to study biological development.

STS-71 will study how weightlessness affects embryo development by returning to Earth a set of pre-fertilized quail eggs incubated on board Mir. The incubation process was stopped at various stages of development, and the embryos placed in a fixative solution for later analysis.

Improved sensors will be carried to orbit by Atlantis to be added to the Mir station greenhouse by the Mir 19 crew. The updated greenhouse will then be ready for plant experiments on future NASA-Mir missions.

Microgravity Research

Living organisms are not the only things affected by microgravity. Inanimate objects and materials, including crystals, are affected by this unique environment. The presence of gravity on Earth makes it difficult to observe the basic processes of crystal growth. STS-71 will carry a protein crystal growth experiment into orbit. It will be transferred to Mir where the experiment will continue under the watchful eyes of the Mir 19 crew.

With the experiment in space for an extended duration, researchers will be able to observe the crystallization of a number of large proteins that may be used in basic biological research, pharmacology and drug development.

As the protein crystal growth experiments take place on Mir, the Space Acceleration Measurement System flown frequently on board the Shuttle, will be in place on board Mir to measure any motion caused by crew activity or engine firings. This information will aid scientists in determining the best location to house protein crystal growth experiments in order to produce the purest possible samples.

Protein Crystal Growth Experiment

Principal Investigator:
Dr. Alexander McPherson
University of California, Riverside
Riverside, CA

STS-71 will carry several hundred protein samples, frozen in a thermos-bottle-like vacuum jacket or dewar, to the Mir space station. After they thaw, the proteins will crystallize until the dewar is retrieved by the STS-74 crew in November.

Proteins are important, complex biological molecules which serve a variety of functions in all living organisms. Determining their molecular structure will lead to greater understanding of their functions within those organisms. Many proteins can be grown as crystals and their structures analyzed by X-ray diffraction. However, some crystals grown in Earth's gravity often have internal defects that make such analysis difficult or impossible.

As demonstrated on Space Shuttle missions since 1985, certain protein crystals grown in space are larger, have fewer defects and have greater internal order than their Earth-grown counterparts. The two-week-long U.S. Microgravity Laboratory (USML-1) mission in 1992 demonstrated that extended duration in orbit is especially valuable in protein crystal growth.

The months-long growing time aboard Mir should produce large protein crystals of sufficient size and quality to compare with corresponding crystals grown in Earth-based laboratories. The Mir experiment will be used to evaluate the effectiveness of flash-frozen bath and liquid-liquid diffusion techniques for growing protein and virus crystals on long-duration space missions. Experience gained will help shape PCG investigations to be conducted aboard the international Space Station.

In liquid-liquid diffusion, a protein solution and a precipitant fluid are brought into contact but not mixed. Over time, the fluids will diffuse into each other through random motion of molecules. The gradual increase in concentration of the precipitant within the protein solution causes the proteins to crystallize. This occurs very slowly, allowing formation of large crystals with highly uniform internal order -- essential for X-ray diffraction analysis of crystals. Liquid-liquid diffusion is difficult on Earth because differences in solution densities allow mixing by gravity-driven thermal convection. In addition, the greater density of the crystals allows them to settle into inappropriate parts of the cell.

A total of 46 different proteins, selected by a committee of scientists, are candidates for the Mir PCG experiment. The various samples will range in size from about five to 5,000 microliters.

Equipment for the Mir experiment is simple and requires virtually no crew activity. A total of 250 to 500 samples (depending on the mix of tubes and sizes chosen) will be divided into three bundles. The bundles will be stacked in a sealed aluminum cylinder, 3.5 inches (8.9 cm) wide and 13.5 inches (34.3 cm) long. The cylinder then will be placed inside an aluminum vacuum jacket, or dewar, lined with a calcium silicate absorbent. The absorbent will be filled with liquid nitrogen at -320 degrees Fahrenheit (-196 degrees Celsius) to flash freeze the samples, blocking diffusion and crystal growth until thawing occurs aboard Mir.

Because the dewar has no active refrigeration, the liquid nitrogen will begin warming slowly and boiling off when the dewar is filled before launch. After Atlantis docks with Mir, the crew will secure the dewar in a quiet area of the Mir station to minimize vibration. The liquid nitrogen will continue to boil off into Mir's oxygen/nitrogen atmosphere. In orbit, the samples will thaw after the nitrogen evaporates (over a period of 10 days). This ensures that all crystallization will occur in the microgravity environment of space. The proteins will crystallize over the next few months at cabin temperature, 72 degrees Fahrenheit (22 degrees Celsius). The dewar will remain within a few degrees of that temperature through STS-74 landing and return of the samples to science investigators.

Protocol Activities During the First Shuttle/Mir Docking Mission

The protocol events planned while STS-71 and Mir are docked include: astronaut/cosmonaut handshakes, a welcoming ceremony, gift exchanges and a farewell ceremony -- all are planned for live NASA Television coverage.

On flight day three, about 90 minutes after the two craft are docked, the hatch will open and Russian and U.S. commanders will enter the docking tunnel, shake hands and exchange greetings. Immediately following will be the welcoming ceremony, where all crewmembers will meet in Mir's core module for introductions and toasts to successful space missions.

With the Russian and U.S. flags as a backdrop, the STS-71 and Mir crews will exchange gifts on flight day four in the Shuttle's Spacelab module. Gifts include a halved pewter medallion bearing a relief image of a docked Shuttle and Mir space station; the two halves will be joined during the ceremony. A 1/200th-scale model of the Shuttle and the Mir also will be joined. These gifts will be presented to the U.S. and Russian Heads of State and the leaders of the two space agencies after the mission.

A proclamation will be signed by both crews certifying the date and time of the docking. The document also states:

"The success of this endeavor demonstrates the desire of these two nations to work cooperatively to achieve the goal of providing tangible scientific and technical rewards that will have far-reaching effects to all people of the planet Earth."

A farewell ceremony will take place aboard Mir. Crews are expected to share personal views of this unique experience with each other, before returning to their respective spacecraft to prepare for undocking.

IMAX

NASA is using the IMAX film medium to document its space activities and better translate them to the public. This system, developed by IMAX Systems, Corp., Toronto, Canada, uses specially designed 70mm film cameras and projectors to record and display very high definition, large screen pictures.

NASA has flown IMAX camera systems on many Shuttle missions, including the recent STS-63 Shuttle-Mir rendezvous. NASA will continue to use IMAX cameras to collect footage for future productions. Film from previous missions was used to create the productions *The Dream is Alive* and *The Blue Planet*.

In-Cabin IMAX Camera Equipment

The IMAX system consists of a camera, lenses, rolls of film, lights, and other equipment that is necessary for filming. The IMAX and supporting equipment are stowed in the middeck for in-cabin use. The IMAX uses two film magazines that can be interchanged as part of the operation; each magazine runs for approximately three minutes. After the crew has used both magazines, they can reload with new film. Lenses are changed as necessary based on the shot. The IMAX will be installed on the orbiter approximately seven days prior to launch.

Shuttle Amateur Radio Experiment-II (SAREX)

Students in the U.S. and Russia will have a chance to speak via amateur radio with astronauts aboard the Space Shuttle Discovery during STS-71. Ground-based amateur radio operators ("hams") will be able to contact the Shuttle astronauts through a direct voice ham radio link as time permits.

Space Shuttle Pilot Charlie Precourt (call sign KB5YSQ) and Mission Specialist Ellen Baker (KB5SIX) will talk to students in five schools in the U.S. and Russia using "ham radio."

Students in the following schools will have the opportunity to talk directly with orbiting astronauts for approximately 4 to 8 minutes:

- Forest Avenue School, Hudson, MA (N1QEQ)
- Suffolk Community College, Seldon, NY (N2XOU)
- Benbrook Elementary School, Benbrook, TX (N5SVW)
- Redlands High School, Redlands, CA (KO6FP)
- School Number 3 Yessentuki, Yessentuki, Russia (YA6HZ)

The radio contacts are part of the SAREX (Shuttle Amateur Radio EXperiment) project, a joint effort by NASA, the American Radio Relay League (ARRL), and the Radio Amateur Satellite Corporation (AMSAT).

The project, which has flown on 17 previous Shuttle missions, is designed to encourage public participation in the space program and support educational initiatives through a program to demonstrate the effectiveness of communications between the Shuttle and low-cost ground stations using amateur radio voice and digital techniques.

STS-71 SAREX Frequencies

Important Note: Since the flight will be the first Shuttle-Mir docking mission, and SAREX and Mir amateur radio stations usually share the same downlink frequency (145.55), the SAREX Working Group has decided to make the following SAREX frequency changes for the STS-71 mission:

For STS-71, SAREX transmissions from the Space Shuttle may be monitored on a worldwide downlink frequency of 145.84MHz.

The voice uplink frequencies are:

144.45 MHz

144.47

The crew will use separate receive and transmit frequencies. **Please do not transmit on the Shuttle's downlink frequency.** The downlink is your receiving frequency. The uplink is your transmitting frequency.

Note: The astronauts will not favor any one of the above frequencies. Therefore, the ability to talk to an astronaut depends on selecting one of the above frequencies chosen by the astronaut.

Additional Information for Amateur Radio Operators

Several audio and digital communication services have been developed to disseminate Shuttle and SAREX-specific information during the flight.

The ARRL ham radio station (W1AW) will include SAREX information in its regular voice and teletype bulletins.

The amateur radio station at the Goddard Space Flight Center, (WA3NAN), will operate around the clock during the mission, providing SAREX information, retransmitting live Shuttle air-to-ground audio, and retransmitting many SAREX school group contacts.

Information about orbital elements, contact times, frequencies and crew operating schedules will be available during the mission from NASA ARRL (Steve Mansfield, 203/666-1541) and AMSAT (Frank Bauer, 301/286-8496). AMSAT will provide information bulletins for interested parties on Internet and amateur packet radio.

Current Keplerian elements to track the Shuttle are available from the NASA Spacelink computer information system (BBS), (205) 895-0028 or via Internet spacelink.msfc.nasa.gov., and the ARRL BBS (203) 666-0578.

The latest element sets and mission information are also available via the Johnson Space Center (JSC) ARC BBS or the Goddard Space Flight Center (GSFC) BBS. The JSC number is (713)244-5625, 9600 Baud or less. The GSFC BBS is available via Internet. The address is wa3nan.gsfc.nasa.gov.

The Goddard Space Flight Center amateur radio club planned HF operating frequencies:

3.860 MHz 7.185 MHz
14.295 21.395
28.650

STS-71 Crew Biographies

The STS-71 crew is comprised of primarily veteran U.S. astronauts and cosmonauts which bring more than 15,000 hours of combined space experience to the first Shuttle/Mir docking mission.

Robert L. Hoot Gibson Commander

STS-71 will be commanded by U.S. Navy Captain Robert L. Hoot Gibson, 48, who will be making his fifth spaceflight.

Gibson was born in Cooperstown, NY, but considers Lakewood, CA, to be his hometown. He received an associate degree in engineering science from Suffolk County Community College in 1966 and a Bachelor's in aeronautical engineering from California Polytechnic State University in 1969.

Gibson entered active duty with the Navy in 1969. He received primary and basic flight training at Naval Air Stations Saufley Field; Pensacola, FL; and Meridian, MS, and completed advanced flight training at the Naval Air Station at Kingsville, TX.

While assigned to Fighter Squadrons 111 and 1 from April 1972 to September 1975, he saw duty aboard the USS Coral Sea and the USS Enterprise, flying combat missions in Southeast Asia. He is a graduate of the Naval Fighter Weapons School, Topgun. Gibson returned to the United States and an assignment as an F-14A instructor pilot with Fighter Squadron 124. He also graduated from the U.S. Naval Test Pilot School, Patuxent River, MD, in June 1977, and later became involved in the test and evaluation of F-14A aircraft while assigned to the Naval Air Test Center's Strike Aircraft Test Directorate.

Gibson was selected as an astronaut in 1978, and since then has logged more than 26 days in space. His first spaceflight was as pilot of STS-41B in February 1984. The flight accomplished the deployment of two communications satellites and tested rendezvous sensors and computer programs for the first time.

He next flew as commander of STS-61C, a six-day flight that included the deployment of the SATCOM KU satellite and the completion in astrophysics and materials processing.

Gibson's third trip to orbit was made in December 1988 on STS-27, a classified Department of Defense mission.

He then returned to space for a fourth time on STS-47 in September 1992. The mission was a cooperative venture between the United States and Japan, focusing on more than 40 life science and materials processing experiments.

From December 1992 to September 1994, Gibson served as chief of the Astronaut Office until he was selected to command the STS-71 mission.

Charles J. Precourt
Pilot

Air Force Lt. Col. Charles J. Precourt, 39, will serve as Atlantis' pilot during his second spaceflight.

Precourt was born in Waltham, MA, but considers Hudson, MA, to be his hometown. He earned a bachelor's degree in aeronautical engineering from the U.S. Air Force Academy in 1977, and master's degrees in engineering management from Golden Gate University, and national security affairs and strategic studies from the U.S. Naval War College in 1988 and 1990, respectively. While at the Air Force Academy, Precourt also attended the French Air Force Academy in 1976 as part of an exchange program.

Precourt graduated from Undergraduate Pilot Training at Reese Air Force Base, TX, in 1978. Initially, he flew as an instructor pilot in the T-37, and later as a maintenance test pilot in the T-37 and T-38 aircraft. From 1982 through 1984, he flew an operational tour in the F-15 Eagle at Bitburg Air Base in Germany. In 1985, he attended the U.S. Air Force Test Pilot School at Edwards Air Force Base, CA. Upon graduation he was assigned as a test pilot at Edwards where he flew F-15E, F-4, A-7 and A-37 aircraft until mid-1989, when he began studies at the U.S. Naval War College.

Precourt was selected as an astronaut candidate in 1990. His technical assignments have included duties in the Astronaut Office operations Development Branch, working on ascent, entry and launch abort issues. Precourt flew his first space mission as a mission specialist on STS-55 in April 1993. The German-sponsored mission included almost 90 experiments designed to investigate life sciences, material sciences, physics, robotics and astronomy. At the conclusion of the flight, he had spent about 240 hours in orbit.

Ellen S. Baker
Mission Specialist 1

Ellen S. Baker, M.D., 42, will be making her third spaceflight as Mission Specialist 1 for STS-71.

Baker was born in Fayetteville, NC, but considers New York City to be her hometown. She received a bachelor's degree in geology from the State University of New York at Buffalo and a doctorate of medicine degree from Cornell University in 1978. After completing medical school, Baker trained in internal medicine at the University of Texas Health Science Center, San Antonio, TX. She was certified by the American Board of Internal Medicine in 1981.

Following her residency, Baker joined NASA as a medical officer at the Johnson Space Center. That same year she graduated from the Air Force Medicine Primary Course at Brooks Air Force Base in San Antonio. Baker was selected as an astronaut candidate in 1985. Her technical assignments have included working with flight crew procedures, flight software verification, operations and engineering support activities and Space Station operation issues. She also has served as chief of the Astronaut Appearance Office.

Baker has logged more than 451 hours in space. Her first mission was STS-34 in October 1989 which successfully started the Galileo spacecraft on its journey to Jupiter. Her second mission was STS-50 in June/July 1992. The STS-50 crew spent about two weeks in orbit to conduct a series of scientific experiments involving crystal growth, fluid physics, fluid dynamics, biological science and combustion science.

Gregory J. Harbaugh Mission Specialist 2

Two-time Shuttle veteran Gregory J. Harbaugh, 39, will serve as Mission Specialist 2.

Harbaugh was born in Cleveland OH, but considers Willoughby, OH, his hometown. He holds a bachelor's degree in aeronautical and astronautical engineering from Purdue University, and a master's degree in physical science from the University of Houston-Clear Lake.

Harbaugh came to the Johnson Space Center after graduation from Purdue. Since 1978, he has held engineering and technical management positions in Space Shuttle flight operations. He also supported missions as a Data Processing Systems Officer from the Mission Control Center for most of the first 25 Shuttle flights.

Selected as an astronaut in June 1987, Harbaugh's technical assignments have included work with the Shuttle Avionics Integration Laboratory, the Shuttle Remote Manipulator System and telerobotics systems development for Space Station. He also has supported the Hubble Space Telescope servicing mission development and extravehicular activity assessment for the international Space Station.

Harbaugh's first mission, STS-39 in April/May 1991, was an eight-day unclassified Department of Defense mission involving research for the Strategic Defense Initiative. His second flight was STS-54 in January 1993. During the six-day mission, the TDRS-F satellite was deployed and Harbaugh participated in a 4-hour, 28-minute space walk. Harbaugh also trained as a backup EVA crew member for the Hubble Space Telescope Servicing mission. With the two missions, Harbaugh has logged more than 343 hours in space.

Bonnie Dunbar
Mission Specialist 3

After training as backup to Mir 18 crew member Norm Thagard, Bonnie Dunbar, Ph.D., 46, will visit the Russian space station as STS-71's Mission Specialist 3.

Dunbar, a native of Sunnyside, WA, received bachelor's and master's degrees in ceramic engineering from the University of Washington in 1971 and 1975, respectively; and a doctorate in biomedical engineering from the University of Houston in 1983.

Following graduation in 1971, Dunbar worked for Boeing Computer Services for two years as a systems analyst. In 1975, she was invited to participate in research at Harwell Laboratories in Oxford, England, as a visiting scientist.

Following her work in England, she accepted a senior research engineer position with Rockwell International Space Division in Downey, CA, where her responsibilities included developing equipment and processes for the manufacture of the Space Shuttle thermal protection system. She currently serves as an adjunct assistant professor in mechanical engineering at the University of Houston and serves on the Bioengineering Advisory Group.

In 1978, Dunbar accepted a position as a payload officer/flight controller at the Johnson Space Center. She served as a guidance and navigation officer for the Skylab reentry mission in 1979 and was subsequently designated project officer/payload officer for the integration of several Shuttle payloads.

Selected as an astronaut in 1981, Dunbar is a veteran of three space flights and has logged more than 761 hours in space. Her first flight, STS-61A, was a cooperative Spacelab mission with West Germany. The payload included more than 75 scientific experiments in the areas of physiological sciences, materials science, biology and navigation. In January 1990, Dunbar served as a mission specialist on STS-32. During the 10-day mission, crew members deployed the Syncom IV-F5 satellite and retrieved the Long Duration Exposure Facility. Dunbar also was principal investigator for the Microgravity Disturbance Experiment using the Fluids Experiment Apparatus on the mission.

The third mission was STS-50 in June-July 1990 for which she served as payload commander. The crew operated around the clock for 13 days performing experiments in scientific disciplines such as protein crystal growth, electronic and infrared detector crystal growth, surface tension physics, zeolite crystal growth and human physiology.

For the past year, Dunbar has been training in Star City, Russia, as back-up cosmonaut researcher for the Mir 18 mission. Following the completion of her training in Russia, she returned to Houston to train for the STS-71 flight.

Anatoly Y. Solovyev
Mir 19 Commander

During the trip to Mir, Atlantis also will carry Mir 19 Commander Anatoly Y. Solovyev and Flight Engineer Nikolai M. Budarin.

Solovyev, 47, served from 1972 to 1976 as a senior pilot and group commander in the Far Eastern Military District. Since August 1976, he has been a student-cosmonaut at the Yuri A. Gagarin Cosmonaut Training Center, completing his general space training in 1979. He is a test pilot third class and a test cosmonaut.

In 1988, he was the commander of a Soviet-Bulgarian crew for an expedition that visited the Mir station. The flight lasted nine days. Then, from Feb. 11 to Aug. 9, 1990, Solovyev accomplished a 179-day flight on board the Mir orbital complex as commander for the sixth primary expedition. During the mission, the crew conducted a series of technological, geophysical and biomedical investigations; performed two spacewalks; and placed the Kristall module into service.

Solovyev's third flight was a 189-day mission to Mir from July 27, 1992, to Feb. 1, 1993. Mission activities included the completion of a Russian-French science program with microgravity, biology, medical, biotechnology and other investigations.

Nikolai M. Budarin
Mir 19 Flight Engineer

Budarin, the flight engineer for Mir 19, will be making his first space flight. Budarin, 42, received a mechanical engineering degree from the S. Ordzhonikidze Moscow Aviation Institute in 1979. He then joined NPO Energia where he was involved in experimental investigations and testing of space technology.

In 1989, Budarin was enrolled in a cosmonaut detachment as a candidate test cosmonaut, completing his training in 1991. He is a qualified test cosmonaut. He also has experience working with the primary operations group for space mission control.

When Atlantis leaves, Solovyev and Budarin will stay at the Mir Station. The Mir 18 crew consisting of Commander Vladimir N. Dezhurov, Flight Engineer Gennady M. Strekalov and U.S. Astronaut and Cosmonaut Researcher Norman E. Thagard, M.D., will return to Earth with the STS-71 crew.

Mir 18 Crew (returning on Atlantis)

Vladimir N. Dezhurov Mir 18 Commander

Dezhurov, 32, is making his first spaceflight as commander of the Mir 18 mission. He is a lieutenant colonel in the Air Force.

Born in the Yavas settlement of the Zubovo-Polyansk district in Mordovia, Russia, Dezhurov graduated from the S.I. Gritsevits Kharkov Higher Military Aviation School in 1983 with a pilot-engineer's diploma. After graduating, he served as a pilot and senior pilot in the Russian Air Force. In 1987, he was assigned to the Cosmonaut Training Center and underwent the general space training from December 1987 to June 1989. Since then he has continued training as a member of a group of test cosmonauts. He also has been a correspondence student at the Yuri A. Gagarin Air Force Academy since 1991.

Gennady M. Strekalov Mir 18 Flight Engineer

Four-time space veteran Strekalov, 54, is an instructor-test cosmonaut and department head at NPO Energiya.

Born in Mytishchi in the Moscow Region of Russia, Strekalov graduated from the N.E. Bauman Moscow Higher Technical School in 1965 with an engineer's diploma. Since then, he has worked at Energiya and has been involved in experimental investigations and the testing of space technology. As part of an operations group, he participated in mission control for flights of scientific-research craft belonging to the Academy of Science.

Strekalov's first spaceflight was a two-week mission in 1980 to the Salyut space station, completing an experimental flight aboard the Soyuz T-3 spacecraft. He visited Salyut again in April 1983 and in April 1984. From Aug. 1 to Dec. 10, 1990, Strekalov completed his fourth spaceflight as the flight engineer on the seventh primary expedition to the Mir orbital complex. At the completion of that flight, he had accumulated 153 days in space.

Norman E. Thagard, M.D. Mir 18 Cosmonaut Researcher

Four-time Shuttle veteran Thagard became the first American to ride on board a Russian launch vehicle when he was launched to the Russian space station on March 14, 1995.

Born in Marianna, FL, Thagard considers Jacksonville, FL, to be his hometown. He attended Florida State University where he received bachelor's and master's degrees in engineering science in 1965 and 1966, respectively.

In September 1966, he entered active duty with the U.S. Marine Corps Reserve. He achieved the rank of captain in 1967, was designated a naval aviator in 1968, and was then assigned to duty flying F-4s at the Marine Corps Air Station in Beaufort, SC. He flew 163 combat missions in Vietnam before returning to the United States and an assignment as an aviation weapons division officer at the Beaufort Air Station.

Thagard resumed his academic studies in 1971 and received a doctor of medicine degree from the University of Texas Southwestern Medical School in 1977. Prior to his joining NASA, he was interning in the Department of Internal Medicine at the Medical University of South Carolina.

Thagard was selected as an astronaut candidate in 1978. His first space mission was as part of the crew of STS-7 in June 1983. During the mission, crew members deployed two satellites, deployed and retrieved the Shuttle Pallet satellite, and conducted a series of scientific investigations. His second flight was STS-51B, the Spacelab-3 science mission, in April/May 1985. Thagard's duties on the mission included deploying the NUSAT satellite, caring for animals in the Research Animal Holding Facility and operating a variety of other experiments.

Thagard went to orbit for a third time in May 1989 during the STS-30 mission. The mission's highlight was the deployment of the Magellan probe, the first U.S. planetary mission since 1978. His fourth flight in January 1992 was STS-42. The flight, called the International Microgravity Laboratory-1 mission, featured 55 experiments from 11 countries, which studied the effects of microgravity on material processing and life sciences.

With the completion of his fourth mission, Thagard logged over 604 hours in space; however, because of his three-month mission on Mir, he now holds the American record for the most time spent on orbit.

SHUTTLE FLIGHTS AS OF APRIL 1995

68 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM — 43 SINCE RETURN TO FLIGHT

STS-51-L
01/28/86
STS-51-A
10/30/83 - 11/06/83
STS-51-F
07/29/83 - 08/06/83
STS-51-B
04/29/83 - 05/03/83
STS-4-B
10/04/84 - 10/13/84
STS-4-C
04/06/84 - 04/13/84
STS-4-B
02/03/84 - 02/11/84
STS-3
08/30/83 - 09/05/83
STS-7
06/18/83 - 06/24/83
STS-6
04/04/83 - 04/09/83

OV-099
Challenger
(10 flights)

STS-65
07/08/94 - 07/23/94
STS-62
03/04/94 - 03/18/94
STS-58
10/18/93 - 11/01/93
STS-55
04/26/93 - 05/06/93
STS-52
10/22/92 - 11/1/92
STS-50
06/25/92 - 07/09/92
STS-40
06/05/91 - 06/14/91
STS-35
12/02/90 - 12/10/90
STS-32
01/09/90 - 01/20/90
STS-28
08/08/89 - 08/13/89
STS-61-C
01/12/88 - 01/18/88
STS-9
11/28/83 - 12/08/83
STS-5
11/11/82 - 11/16/82
STS-4
06/27/82 - 07/04/82
STS-3
03/22/82 - 03/30/82
STS-2
03/12/81 - 03/14/81
STS-1
04/12/81 - 04/14/81

OV-102
Columbia
(17 flights)

STS-63
02/03/95 - 02/11/95
STS-64
09/09/94 - 09/20/94
STS-60
02/03/94 - 02/11/94
STS-51
09/12/93 - 09/22/93
STS-56
04/08/93 - 04/17/93
STS-53
12/2/92 - 12/9/92
STS-42
01/22/92 - 01/30/92
STS-48
09/12/91 - 09/18/91
STS-39
04/28/91 - 05/06/91
STS-41
10/06/90 - 10/10/90
STS-31
04/24/90 - 04/29/90
STS-33
11/22/89 - 11/27/89
STS-29
03/13/89 - 03/18/89
STS-26
09/29/88 - 10/03/88
STS-51-J
08/27/85 - 09/03/85
STS-6
06/17/85 - 06/24/85
STS-1-D
04/12/85 - 04/19/85
STS-51-C
01/24/85 - 01/27/85
STS-51-A
11/08/84 - 11/16/84
STS-41-D
08/30/84 - 09/04/84

OV-103
Discovery
(20 flights)

STS-66
11/03/94 - 11/14/94
STS-46
7/31/92 - 8/8/92
STS-45
03/24/92 - 04/02/92
STS-44
11/24/91 - 12/01/91
STS-43
08/02/91 - 08/11/91
STS-37
04/05/91 - 04/11/91
STS-38
11/15/90 - 11/20/90
STS-36
02/28/90 - 03/04/90
STS-34
10/18/89 - 10/23/89
STS-30
05/04/89 - 05/08/89
STS-27
12/02/88 - 12/06/88
STS-51-B
11/26/85 - 12/03/85
STS-51-J
10/03/85 - 10/07/85

OV-104
Atlantis
(13 flights)

STS-67
03/02/95 - 03/18/95
STS-68
09/30/94 - 10/11/94
STS-59
04/09/94 - 04/20/94
STS-61
12/2/93 - 12/13/93
STS-57
6/21/93 - 7/1/93
STS-54
01/13/93 - 01/19/93
STS-47
09/12/92 - 09/20/92
STS-49
05/07/92 - 05/16/92

OV-105
Endeavour
(8 flights)

CHRONOLOGY OF SELECTED HIGHLIGHTS IN THE FIRST 100 AMERICAN HUMAN SPACEFLIGHTS, 1961-1995

May 5, 1961

Freedom 7, the first piloted Mercury spacecraft (No. 7) carrying Astronaut Alan B. Shepard, Jr., was launched from Cape Canaveral by Mercury-Redstone (MR-3) launch vehicle, to an altitude of 115,696 feet and a range of 302 miles. It was the first American space flight involving human beings. Shepard demonstrated that individuals can control a vehicle during weightlessness and high G stresses, and significant scientific biomedical data were acquired. He reached a speed of 5,100 miles per hour and his flight lasted 14.8 minutes.

Feb. 20, 1962

John Glenn became the first American to circle the Earth, making three orbits in his *Friendship 7* Mercury spacecraft. Despite some problems with spacecraft—Glenn flew parts of the last two orbits manually because of an autopilot failure and left his normally jettisoned retrorocket pack attached to his capsule during reentry because of a loose heat shield—this flight was enormously successful. The public, more than celebrating the technological success, embraced Glenn as a personification of heroism and dignity. Among other engagements, Glenn addressed a joint session of Congress and participated in several ticker-tape parades around the country.

May 15-16, 1963

The capstone of Project Mercury, the flight of *Faith 7*, took place on this date with the flight of astronaut L. Gordon Cooper, who circled the Earth 22 times in 34 hours.

Mar. 23, 1965

Following two unoccupied orbital test flights, the first operational mission of Project Gemini took place on March 23, 1965. Mercury astronaut Gus Grissom commanded the mission, with John W. Young, a Naval aviator chosen as an astronaut in 1962, accompanying him.

Jun. 23-25, 1965

The second piloted Gemini mission, GT-4, stayed aloft for four days and astronaut Edward H. White II performed the first extra-vehicular activity (EVA) or spacewalk by an American.

Oct. 11-22, 1968

The first piloted flight of the Apollo spacecraft, Apollo 7, and Saturn IB launch vehicle, this flight involved astronauts Walter M. Schirra, Jr., Donn F. Eisele, and Walter Cunningham who tested hardware in Earth orbit.

Dec. 21-27, 1968

On December 21, 1968, Apollo 8 took off atop a Saturn V booster from the Kennedy Space Center with three astronauts aboard—Frank Borman, James A. Lovell, Jr., and William A. Anders—for a historic mission to orbit the Moon. At first it was planned as a mission to test Apollo hardware in the relatively safe confines of low Earth orbit, but senior engineer George M. Low of the Manned Spacecraft Center at Houston, Texas (renamed the Johnson Space Center in 1973), and Samuel C. Phillips, Apollo Program Manager at NASA headquarters, pressed for approval to make it a circumlunar flight. The advantages of this could be important, both in technical and scientific knowledge

gained as well as in a public demonstration of what the U.S. could achieve. In the summer of 1968 Low broached the idea to Phillips, who then carried it to the administrator, and in November the agency reconfigured the mission for a lunar trip. After Apollo 8 made one and a half Earth orbits its third stage began a burn to put the spacecraft on a lunar trajectory. As it traveled outward the crew focused a portable television camera on Earth and for the first time humanity saw its home from afar, a tiny, lovely, and fragile "blue marble" hanging in the blackness of space. When it arrived at the Moon on Christmas Eve this image of Earth was even more strongly reinforced when the crew sent images of the planet back while reading the first part of the Bible—"And God created the heavens and the Earth, and the Earth was without form and void"—before sending Christmas greetings to humanity. The next day they fired the boosters for a return flight and "splashed down" in the Pacific Ocean on December 27. It was an enormously significant accomplishment coming at a time when American society was in crisis over Vietnam, race relations, urban problems, and a host of other difficulties. And if only for a few moments the nation united as one to focus on this epochal event. Two more Apollo missions occurred before the climax of the program, but they did little more than confirm that the time had come for a lunar landing.

Jul. 16-24, 1969

The first lunar landing mission, Apollo 11 lifted off on July 16, 1969, and after confirming that the hardware was working well began the three day trip to the Moon. At 4:18 p.m. EST on July 20, 1969, the Lunar Module—with astronauts Neil A. Armstrong and Edwin E. Aldrin—landed on the lunar surface while Michael Collins orbited overhead in the Apollo command module. After checkout, Armstrong set foot on the surface, telling the millions of listeners that it was "one small step for man—one giant leap for mankind." Aldrin soon followed him out and the two plodded around the landing site in the 1/6 lunar gravity, planted an American flag but omitted claiming the land for the U.S. as had routinely been done during European exploration of the Americas, collected soil and rock samples, and set up some experiments. The next day they launched back to the Apollo capsule orbiting overhead and began the return trip to Earth, "splashing down" in the Pacific on July 24.

Apr. 11-17, 1970

The flight of Apollo 13 was one of the near disasters of the Apollo flight program. At 56 hours into the flight, an oxygen tank in the Apollo service module ruptured and damaged several of the power, electrical, and life support systems. People throughout the world watched and waited and hoped as NASA personnel on the ground and the crew, well on their way to the Moon and with no way of returning until they went around it, worked together to find a way safely home. While NASA engineers quickly determined that sufficient air, water, and electricity did not exist in the Apollo capsule to sustain the three astronauts until they could return to Earth, they found that the Lunar Module—a self-contained spacecraft unaffected by the accident—could be used as a "lifeboat" to provide austere life support for the return trip. It was a close-run thing, but the crew returned safely on April 17, 1970. The near disaster served several important purposes for the civil space program—especially prompting reconsideration of the propriety of the whole effort while also solidifying in the popular mind NASA's technological genius.

Jul. 26-Aug. 7, 1971

The first of the longer, expedition-style lunar landing missions, Apollo 15 was the first to include the lunar rover to extend the range of the astronauts on the Moon. They brought back one of the prize artifacts of the Apollo program, a sample of ancient lunar crust called the "Genesis Rock."

Dec. 7-19, 1972

Apollo 17 was the last of the Apollo missions to the Moon, and the only one to include

a scientist—astronaut/geologist Harrison Schmitt—as a member of the crew.

May 25-Jun. 22, 1973

Following the launch of the orbital workshop, Skylab, on May 14, 1973, the Skylab 2 mission began. The workshop had developed technical problems due to vibrations during lift-off and the meteoroid shield—designed also to shade Skylab's workshop from the Sun's rays—ripped off, taking with it one of the spacecraft's two solar panels, and another piece wrapped around the other panel keeping it from properly deploying. In spite of this, the space station achieved a near-circular orbit at the desired altitude of 270 miles. While NASA technicians worked on a solution to the problem, an intensive ten-day period followed before the Skylab 2 crew launched to repair the workshop. After substantial repairs requiring extravehicular activity (EVA), including deployment of a parasol sunshade that cooled the inside temperatures to 75 degrees Fahrenheit, by June 4 the workshop was in full operation. In orbit the crew conducted solar astronomy and Earth resources experiments, medical studies, and five student experiments. This crew made 404 orbits and carried out experiments for 392 hours, in the process making three EVAs totaling six hours and 20 minutes. The first group of astronauts returned to Earth on June 22, 1973, and two other Skylab missions followed.

Jul. 15-24, 1975

The Apollo-Soyuz Test Project was the first international human space flight, taking place at the height of the détente between the United States and the Soviet Union during the mid-1970s. It was specifically designed to test the compatibility of rendezvous and docking systems for American and Soviet spacecraft, and to open the way for international space rescue as well as future joint missions. To carry out this mission existing American Apollo and Soviet Soyuz spacecraft were used. The Apollo spacecraft was nearly identical to the one that orbited the Moon and later carried astronauts to Skylab, while the Soyuz craft was the primary Soviet vehicle used for cosmonaut flight since its introduction in 1967. A universal docking module was designed and constructed by NASA to serve as an airlock and transfer corridor between the two craft. Astronauts Thomas P. Stafford, Vance D. Brand, and Donald K. Slayton took off from Kennedy Space Center on July 15, to meet the already orbiting Soyuz spacecraft. Some 45 hours later the two craft rendezvoused and docked, and then Apollo and Soyuz crews conducted a variety of experiments over a two-day period. After separation, the Apollo vehicle remained in space an additional six days while Soyuz returned to Earth approximately 43 hours after separation. The flight was more a symbol of the lessening of tensions between the two superpowers than a significant scientific endeavor, a sharp contrast with the competition for international prestige that had fueled much of the space activities of both nations since the late 1950s.

Apr. 12, 1981

Astronauts John W. Young and Robert L. Crippin flew Space Shuttle *Columbia* on the first flight of the Space Transportation System (STS-1). *Columbia*, which takes its name from three famous vessels including one of the first U.S. Navy ships to circumnavigate the globe, became the first airplane-like craft to land from orbit for reuse when it touched down at Edwards Air Force Base in southern California at approximately 10:21 a.m. Pacific Standard Time on April 14th after a flight of two days, six hours and almost 21 minutes. The mission also was the first to employ both liquid- and solid-propellant rocket engines for the launch of a spacecraft carrying humans.

Jun. 18, 1983

Astronauts Robert L. Crippin and Frederick H. Hauck piloted Space Shuttle *Challenger* (STS-7) on a mission to launch two communications satellites and the reusable Shuttle Pallet Satellite (SPAS 01). Sally K. Ride, one of three mission specialists on the first Shuttle flight with five crewmembers, became the first American woman astronaut.

Challenger was named after the H.M.S. *Challenger*, an English research vessel operating from 1872 to 1876.

Aug. 30, 1983

Astronauts Richard H. Truly and Daniel C. Brandstein piloted Space Shuttle *Challenger* (STS-8) on another historic mission, carrying the first black American astronaut, Guion S. Bluford, into space as a mission specialist. The astronauts launched communications satellite Insat 1B into orbit.

Nov. 28, 1983

Astronauts John W. Young and Brewster W. Shaw piloted Space Shuttle *Columbia* (STS-9) on a mission that carried the first non-U.S. astronaut to fly in the U.S. space program, West German Ulf Merbold. *Columbia* also transported Spacelab 1, the first flight of this laboratory in space, carrying more than 70 experiments in 5 areas of scientific research: astronomy and solar physics, space plasma physics, atmospheric physics and Earth observations, life sciences, and materials science.

Jan. 28, 1986

The Space Shuttle *Challenger*, STS-51L, was tragically destroyed and its crew of seven was killed, during its launch from the Kennedy Space Center about 11:40 a.m. The explosion occurred 73 seconds into the flight as a result of a leak in one of two Solid Rocket Boosters that ignited the main liquid fuel tank. The crewmembers of the *Challenger* represented a cross-section of the American population in terms of race, gender, geography, background, and religion. The explosion became one of the most significant events of the 1980s, as billions around the world saw the accident on television and empathized with any one of the several crewmembers killed. The disaster prompted a thorough review of the shuttle program and NASA overall, leading to substantive reforms in the management structure, safety program, and procedures of human spaceflight.

Apr. 24-29, 1990

During the flight of the Space Shuttle *Discovery* (STS-31) the crew deployed the Hubble Space Telescope. Soon after deployment, controllers found that the telescope was flawed by a "spherical aberration," a mirror defect only 1/25th the width of a human hair, that prevented Hubble from focusing all light to a single point. At first many believed that the spherical aberration would cripple the 43-foot-long telescope, and NASA received considerable negative publicity, but soon scientists found a way with computer enhancement to work around the abnormality and engineers planned a servicing mission to fully correct it with an additional instrument. Even with the aberration, Hubble made many important astronomical discoveries, including striking images of galaxy M87, providing evidence of a potentially massive black hole.

Dec. 2-12, 1993

Astronauts Richard O. Covey and Kenneth D. Bowersox piloted Space Shuttle *Endeavour* (STS-61) on a highly successful mission to service the optics of the Hubble Space Telescope (HST) and perform routine maintenance on the orbiting observatory. Following a precise and flawless rendezvous, grapple, and berthing of the telescope in the cargo bay of the Shuttle, the *Endeavour* flight crew, in concert with controllers at Johnson Space Center, Houston, Texas, and Goddard Space Flight Center, Greenbelt, Maryland, completed all eleven planned servicing tasks during five extravehicular activities for full accomplishment of all STS-61 servicing objectives. This included installation of a new Wide Field & Planetary Camera and sets of corrective optics for all the other instruments, as well as replacement of faulty solar arrays, gyroscopes, magnetometers, and electrical components to restore the reliability of the observatory subsystem. *Endeavour* then provided HST with a reboost into a 321-nautical-mile, nearly circular orbit. Re-deployment of a healthy HST back into orbit using the shuttle robotic arm

occurred at 5:26 a.m. EST on December 10th, and the telescope was once again a fully operational, free-flying spacecraft with vastly improved optics. Orbital verification of HST's improved capabilities occurred in early Jan., well ahead of the March schedule. *Endeavour*, the newest of the orbiters, was named after the eighteenth century vessel captained by British explorer Capt. James Cook. The new Shuttle craft took its maiden voyage in May 1992.

Feb. 3-11, 1994

Astronauts Charles F. Bolden and Kenneth S. Reightler, Jr., flew Space Shuttle *Discovery* (STS-60) on a historic mission featuring the first Russian cosmonaut to fly on a U.S. mission in space, Mission Specialist Sergei K. Krikalev, veteran of two lengthy stays aboard the Russian *Mir* Space Station. This mission underlined the newly inaugurated cooperation in space between Russia and the U.S., featuring Russia's becoming an international partner in the international space station effort involving the U.S. and its international partners.

Feb. 3-11, 1995

Exactly one year after a major cooperative flight with the Russians in STS-60, NASA's Space Shuttle *Discovery*, this time STS-63, flew another historic mission featuring the flyby of the Russian *Mir* Space Station. It also featured the first time that a woman pilot, Eileen M. Collins, flew the Space Shuttle.

ZH/Roger Launius/202-358-0383/June 7, 1995

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

For Release

May 30, 1995

RELEASE: 95-78

NASA ESTABLISHES MINORITY UNIVERSITY RESEARCH CENTERS

NASA has selected seven universities to receive Minority University Research Center (MURC) cooperative agreement awards to enhance broad-based competitive research capability in NASA-related science and engineering pursuits.

The MURC awards will provide the universities with research funding for five years. Each university will receive approximately \$1.5 million for the first three years and \$750,000 to \$1 million for the final two years of research activities.

The awards are intended to enhance each university's competitive research capabilities, to expand the nation's base for aerospace research and development and to increase participation of faculty and students from minority institutions in NASA-related research. The research will be in areas related to NASA's five strategic enterprises: Mission to Planet Earth, Aeronautics, Human Exploration and Development of Space, Space Science, and Space Technology.

The universities selected to receive these awards are:

- Alabama A&M University, Normal, AL
Center for Hydrology, Soil Climatology and Remote Sensing
- Morehouse School of Medicine, Atlanta, GA
Center for Space Medicine and Life Sciences
- Prairie View A&M University, Prairie View, TX
Center for Applied Radiation Research
- Tennessee State University, Nashville, TN
Center for Automated Space Science
- The University of New Mexico, Albuquerque, NM
Center for Autonomous Control Engineering
- The University of Puerto Rico, Mayaguez Campus
Tropical Center for Earth and Space Studies
- The University of Texas at El Paso
The Pan American Center for Earth and Environmental Studies

-more-

The MURC program was established by NASA in 1990. This selection brings the total number of research centers to 14. The following are the initial NASA Minority University Research Centers that were selected in 1991:

- Clark Atlanta University, Atlanta, GA
High Performance Polymers and Ceramics Research Center
- Fisk University, Nashville, TN
Center for Photonic Materials and Devices
- Florida A&M University, Tallahassee, FL
Center for Nonlinear and Nonequilibrium Aeroscience
- Hampton University, Hampton, VA
Research Center for Optical Physics
- Howard University, Washington, DC
Center for the Study of Terrestrial and Extraterrestrial Atmospheres
- North Carolina A&T State University, Greensboro, NC
Center for Aerospace Research
- Tuskegee University, Tuskegee, AL
Center for Food Production and Waste Management in Controlled Ecological Life Support Systems.

The awards are a result of a competitive selection process among proposals submitted by Historically Black Colleges and Universities and other minority universities including Hispanic-Serving Institutions.

The MURC program is sponsored by NASA's Office of Equal Opportunity Programs, Washington, DC, with the support and collaboration from NASA program offices.

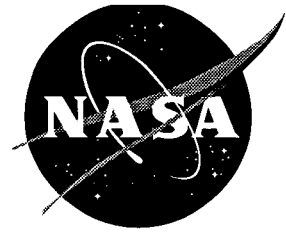
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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

May 31, 1995

VIDEO ADVISORY: V95-76

SPECTR-MIR DOCKING REPLAYED ON NASA TV THURSDAY

On Thursday NASA TV will replay the scheduled Wednesday night docking of the Spectr science module to the Russian Mir space station. The docking is due to take place between 8:30-9:15 p.m. EDT Wednesday. *The transmission times for the news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: *Science Module Docks with Mir*

TRT: tbd

The Specktr science module, launched from Russia May 20th, is the fifth in a series of science and habitation modules sent to Mir since 1986. Spectr contains U.S. science hardware that will be used by American astronauts visiting the Mir during future cooperative missions.

ITEM #2: *Cockpit Simulation Training*

TRT: 2:51

Members of the STS-70 crew are shown training in a Space Shuttle simulator in preparation for the June 8 launch of Discovery on a communications satellite deployment mission.

ITEM #3: *The Satellite System*

TRT: 4:48

STS-70 will deploy the sixth Tracking and Data Relay Satellite during their June mission. Video describes NASA's space-bound satellite communications network.

ITEM #4: *REPLAY - Crew Bail-Out Training*

TRT: 4:51

ITEM #5: *John Glenn with Ohio astronauts preview next mission*

TRT: 2:26

Former Mercury 7 astronaut and U.S. Senator John Glenn meets with Ohio crewmembers of the upcoming STS-70 mission at the Johnson Space Center, Houston, TX, on May 31. The Senator and crewmembers visit a Shuttle simulator during a tour of Johnson.

ITEM #6: *New Airborne Research Plane Roll-Out*

TRT: 1:30

A new DC-9 scientific research aircraft was rolled-out at NASA's Lewis Research Center, Cleveland, OH on Wednesday. The aircraft creates a near weightless environment similar to that experienced during space flight.

ITEM #7: *Interview with Jack Salzman of Lewis Research Center*

TRT: 2:04

Salzman, Deputy Chief, Science Experiments Division, explains how the DC-9 will help researchers conduct experiments in a low gravity environment.

ITEM #8: *REPLAY - Science Payload Transported to Kennedy Space Center*

TRT: 3:40

ITEM #9: *Expanded Interview - STS-70 Mission Commander Henricks*

TRT: 15:04

ITEM #10: *REPLAY - Music Video Commemorating 100th Human Flight*

TRT: 2:20

ITEM #11: *REPLAY - Ride of Your Life*

TRT: 4:38

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release



National Aeronautics and
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Washington, DC 20546
(202) 358-1600

For Release

May 31, 1995

Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

Lori Rachul
Lewis Research Center, Cleveland, OH
(Phone: 216/433-8806)

RELEASE: 95-79

NASA ROLLS OUT NEWEST AIRBORNE RESEARCH FACILITY

NASA today held a ceremonial roll out of a DC-9 aircraft that will serve as an airborne research facility for microgravity science.

The DC-9 aircraft, operated by NASA's Lewis Research Center, Cleveland, OH, makes a state of near weightlessness or microgravity available to scientists and engineers for brief periods.

The aircraft will be dedicated to performing NASA's microgravity research in the areas of biotechnology, combustion science, fluid physics and materials science. The aircraft will provide investigators with a series of 18-22 second periods of microgravity by flying parabolic maneuvers. This provides a significant period of microgravity allowing investigators to conduct experiments and develop equipment for use on the international Space Station and other orbital platforms.

The microgravity environment allows scientists to temporarily minimize the effects of gravity which in turn provides a better understanding of the role that gravity plays in chemical, physical and biological processes and phenomena. The microgravity environment aboard the DC-9 also allows scientists to study phenomena that are obscured by the effects of gravity.

The DC-9 arrived at Lewis in October, 1994 as a fully equipped passenger aircraft. Modifications included removal of the passenger interior and installation of a new interior with a new electrical power distribution system for research equipment.

-more-

-2-

The retrofit also included a low gravity guidance system, which helps pilots fly highly accurate parabolic trajectories and a research data distribution system that provides flight data to researchers at five different locations in the aircraft.

-end-

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News Release

National Aeronautics and
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Washington, DC 20546
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Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

For Release

May 31, 1995

Lori Rachul
Lewis Research Center, Cleveland, OH
(Phone: 216/433-8806)

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NewsRelease

National Aeronautics and
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Don Savage
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For Release

May 31, 1995

Jim Sahli
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RELEASE: 95-80

NASA'S X-RAY TIMING EXPLORER SHIPPED TO LAUNCH SITE

The X-ray Timing Explorer (XTE) spacecraft is being shipped to its launch site in Florida today from the Goddard Space Flight Center in Greenbelt, MD. When it is launched this August, XTE will gather data about X-ray emitting star systems and other sources within the Milky Way galaxy and beyond.

The satellite has completed its environmental testing program and is being flown to the Cape Canaveral Air Station launch site by an Air Force C-5 aircraft from Andrews AFB in Maryland.

The 6,700-pound (3,045-kilogram) spacecraft currently scheduled for launch August 31 aboard a Delta II Expendable Launch Vehicle was integrated and tested at Goddard, which is managing this mission. After several months of preparing the X-ray observatory for flight in Florida, XTE will be launched into a 360-mile (580-km) low-Earth orbit.

Spacecraft engineers and scientists from the three XTE instrument teams gathered at Goddard this month for a final rehearsal of mission operation activities before shipping the spacecraft to the launch site. The instruments are being provided by science and engineering teams at Goddard, the University of California at San Diego, and the Massachusetts Institute of Technology.

"It is great to see the whole spacecraft shipped to the Cape after several years of pulling the different pieces together," said Dale Schulz, Project Manager for the XTE mission in Goddard's Flight Projects Directorate.

"XTE will carry three instruments for studies of the variable X-ray sky: the Proportional Counter Array, the High Energy X-ray Timing Experiment and the All Sky Monitor. A two-year prime mission is scheduled, with extended operations for four to five years possible," said Dr. Jean Swank, project scientist for the XTE at Goddard.

-more-

"XTE will carry out in-depth timing and spectral studies of X-ray sources across a wide range of X-ray energies to answer questions about collapsed compact stars -- white dwarfs, neutron stars, and black holes, and about very large black holes in quasars and galaxies," she said.

"The X-ray sky is highly variable. Suddenly an obscure faint star lost in the crowd can become the brightest X-ray source in the sky, revealing where a black hole is likely to be found. Neutron stars emit beams of X-rays that sweep across our view as the stars rotate. XTE is tuned to watch the action and study it. These data will allow us to study the strongest gravitational and magnetic fields that we think exist in the universe," she said.

Observations of specific targets to be studied with XTE will be proposed by scientists from the United States and abroad. Selected observations will be implemented by scientists at the XTE Science Operations Center (SOC) at Goddard. XTE will transmit data via two of NASA's Tracking and Data Relay Satellites, which will then relay the data to a ground station in White Sands, NM, and then to the SOC. Scientists can monitor observations from the SOC. Data are sent to their home institutions for detailed analysis.

Goddard manages the X-ray Timing Explorer for the Office of Space Science at NASA Headquarters in Washington, DC.

- end -

EDITOR'S NOTE: For additional information about the mission, information about XTE is available on the World Wide Web at the following Internet address:

<http://heasarc.gsfc.nasa.gov/docs/xte/xte.html>

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NewsRelease

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Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1780)

For Release

May 31, 1995

Kyle Herring
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-81

SPACEWALKERS SELECTED FOR SECOND HUBBLE SERVICING MISSION

NASA has selected four astronauts to conduct spacewalks for the second flight to service the Hubble Space Telescope in early 1997.

Astronauts Mark C. Lee, Gregory J. Harbaugh, Steven L. Smith and Joseph R. Tanner will be the extravehicular activity crew for Space Shuttle mission STS-82.

The mission plan, scheduled to include at least three spacewalks, currently includes changeout of two science instruments and a data interface unit. The instruments are the Space Telescope Imaging Spectrograph and the Near Infrared Camera Multi-Object Spectrometer.

Lee, 42, (Colonel, USAF) has flown on three Shuttle missions -- STS-30 in May 1989, STS-47 in September 1992 and STS-64 in September 1994. He conducted the first untethered spacewalk in ten years during his last mission. Lee will act as Payload Commander for this servicing mission. He earned a master of science degree in mechanical engineering from the Massachusetts Institute of Technology in 1980. He was born in Viroqua, WI.

Harbaugh, 39, is a member of the STS-71 flight crew scheduled to dock with the Russian Space Station Mir in June 1995. He has flown on two previous Shuttle missions -- STS-39 in April 1991 and STS-54 in January 1993. In addition to conducting a spacewalk on STS-54, Harbaugh also served as the backup spacewalking astronaut on the first Hubble servicing mission in December 1993 and was the spacecraft communicator in Mission Control for the five spacewalks during the flight.

-more-

He graduated from Purdue University with a bachelor of science degree in astronautical engineering in 1978 and received a master of science degree in physical science from the University of Houston-Clear Lake in 1986. Originally from Cleveland, OH, Harbaugh considers Willoughby his hometown.

Smith, 36, flew on STS-68 in September/October 1994. He served as a payloads officer in Mission Control prior to becoming an astronaut. Smith earned a master of science degree in electrical engineering in 1982 and a master of science degree in business administration in 1987, both from Stanford University. He considers San Jose, CA, his hometown.

Tanner, 45, flew on STS-66 in November 1994. Prior to becoming an astronaut, he was a research and instructor pilot, specializing in Shuttle landing techniques in the Gulfstream Shuttle Training Aircraft and T-38 trainers. Tanner earned a bachelor of science degree in mechanical engineering from the University of Illinois in 1973. He is from Danville, IL.

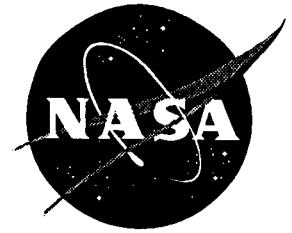
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NewsRelease

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For Release

Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

June 1, 1995

NOTE TO EDITORS: N95-33

NASA CO-SPONSORS NEUROSCIENCE AND SPACE SYMPOSIUM

NASA and the National Foundation for Brain Research will hold a neuroscience and space symposium at 9 a.m. EDT, Tuesday, June 6, on the 13th Floor of the National Press Club, 529 14th St., NW, Washington, DC.

The symposium will provide an overview of space neuroscience and explore the possibilities for conducting unique neuroscience research in space. In addition, the symposium will highlight NASA's Neuroscience Research Program, including Neurolab, a Space Shuttle mission scheduled for early 1998, devoted to brain and behavior research. Researchers will present findings from recent ground-based and flight studies and will speculate about other research areas that can exploit the unique environment of space to better understand brain function and behavior.

The neuroscience research community is in a position to capitalize on the enormous strides that have been made in neuroscience during the last 25-years of space flight and a new era of opportunities for conducting research in space on the international Space Station. The Station will allow investigators to conduct studies that can build on the scientific foundation laid by past space neuroscience research efforts.

Media requesting accreditation should contact Michele Campbell at 202/293-5453 or via facsimile at 202/466-2888.

- end -

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News Release

National Aeronautics and
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(202) 358-1600



For Release

Sarah Keegan
Headquarters, Washington, DC
(Phone: 202/358-1902)

June 1, 1995

NOTE TO EDITORS: N95-34

NASA ADMINISTRATOR'S SEMINAR SCHEDULED

"Sustaining Life on the Earth," the next public seminar in a series to help shape a unified agenda for the future of NASA's space program, will be held at 3 p.m. EDT, on Monday, June 5, in NASA's west lobby auditorium, 300 E St., SW, Washington, DC.

Dr. Robert Kates, Brown University, and Dr. Diana Liverman, The Pennsylvania State University, will discuss the effects of population growth on the planet's resources, as well as a vision for an environmentally sustainable future.

The seminar series, initiated by NASA Chief Scientist Dr. France Anne Cordova and introduced by NASA Administrator Daniel S. Goldin, will continue over the next year and will consider fundamental questions that bear on NASA's greatest challenges.

Media representatives who wish to cover the event with cameras should notify (by 1 p.m. EDT on June 5) Sarah Keegan, NASA Public Affairs, at 202/358-1902.

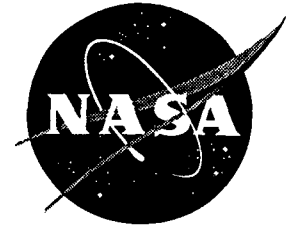
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Don Savage
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For Release

June 1, 1995

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Goddard Space Flight Center, Greenbelt, MD
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Ray Villard
Space Telescope Science Institute, Baltimore, MD
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NOTE TO EDITORS: N95-35

"STARS UNDER CONSTRUCTION" AT SPACE ASTRONOMY UPDATE, JUNE 6

NASA's next Space Astronomy Update will feature recent Hubble Space Telescope images showing spectacular blowtorch-like jets and bursts of material accompanying the final "construction" stages in the birth of a star. The Update will be held at 2 p.m. EDT, Tuesday, June 6, at the Goddard Space Flight Center Visitor's Center, Greenbelt, MD.

Panelists will be Dr. Christopher J. Burrows, European Space Agency and Space Telescope Science Institute (STScI), Baltimore, MD; Dr. Jeff Hester, Arizona State University, Tempe; Dr. Jon A. Morse, STScI; Dr. Stephen P. Maran, Goddard Space Flight Center; Dr. Bruce Margon, University of Washington, Seattle.

The event will be carried live on NASA Television with questions and answers from participating NASA Centers. NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

- end -

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Video Advisory

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For Release

June 1, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-77

NEW MISSION CONTROL CENTER SHOWN ON NTV FRIDAY

Friday's NASA TV news file will open with footage of the new Mission Control Center at the Johnson Space Center, Houston. *The transmission times for the news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: *New Mission Control Center at Johnson Space Center* TRT: tbd

Footage of the new Mission Control Center at JSC. The new MCC will be used for the first time during the next Space Shuttle mission. The new MCC has been modernized for optimum performance during space missions.

ITEM #2: *Inspection of the External Tank of STS-70 (possible)* TRT: tbd

NASA technicians inspecting the External Tank of the Space Shuttle Discovery.

ITEM #3: *Woodpecker at pad* TRT: 1:54

A flicker woodpecker pecks at the external tank of STS-70. Efforts are being made to keep birds away from the pad.

ITEM #4: *Science Module Docks with Mir* TRT: tbd

The Specktr science module, launched from Russia May 20th, is the fifth in a series of science and habitation modules sent to Mir since 1986. Specktr contains U.S. science hardware that will be used by American astronauts visiting the Mir during future cooperative missions. Specktr successfully docked with Mir May 31.

ITEM #5: *REPLAY - Cockpit Simulation Training* TRT: 2:51

ITEM #6: *REPLAY - The Tracking and Data Relay Satellite System* TRT: 4:48

ITEM #7: *REPLAY - Crew Bail-Out Training* TRT: 4:51

ITEM #8: *REPLAY - John Glenn with Ohio astronauts preview next mission* TRT: 2:26

ITEM #9: *Expanded Interview - STS-70 Mission Specialist Nancy Curie* TRT: 7:15

ITEM #10: *REPLAY - Music Video Commemorating 100th Human Flight* TRT: 2:20

ITEM #11: *REPLAY - Ride of Your Life* TRT: 4:38

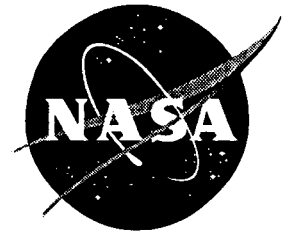
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NewsRelease

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Douglas Isbell
Headquarters, Washington, DC
(Phone: 202/358-1753)

For Release
June 1, 1995

Patricia Viets
National Oceanic and Atmospheric Administration, Suitland, MD
(Phone: 301/457-5005)

Lt. Col. Dave Simms
Department of Defense, Washington, DC
(Phone: 703/697-5131)

RELEASE: 95-82

AGENCIES ESTABLISH NEW CIVIL-MILITARY SATELLITE PROGRAM

The Clinton Administration has taken a major step toward combining the country's military and civilian weather satellite programs into a single system -- a move that is expected to save American taxpayers up to \$300 million through 1999, with additional savings through the life of the program.

Secretary of Commerce Ronald H. Brown, Secretary of Defense William J. Perry, and NASA Administrator Daniel S. Goldin signed a formal agreement on May 26, establishing the agencies' roles and responsibilities in support of the new system and implementing a Presidential Decision Directive that was signed last year.

"Combining these programs was a key recommendation of Vice President Gore's National Performance Review," said Under Secretary of Commerce for Oceans and Atmosphere, D. James Baker. "The new program will result in a major reduction of acquisition, operational and facilities costs."

Currently four U.S. polar-orbiting satellites are used to collect operational, meteorological, oceanographic, climatic and space environment data. Two satellites are provided and operated by the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and two by the Department of Defense's Defense Meteorological Satellite Program. The new combined program will consist of three satellites. The first satellite under the new system, called the National Polar-orbiting Operational Environmental Satellite System (NPOESS), is expected to be launched in 2006.

-more-

-2-

To acquire and operate the NPOESS, the Department of Defense, NASA and NOAA have established an Integrated Program Office. James T. Mannen, a retired Air Force Colonel with extensive experience in space programs, was named director of the office on May 30.

The signing of the agreement by the three agencies represents a tangible and significant step forward in interagency cooperation -- merging operational military and civilian systems, while still satisfying each agency's critical mission requirements and doing so at reduced cost to American taxpayers.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1780)

For Release
June 2, 1995

Bruce Buckingham
Kennedy Space Center, FL
(Phone: 407/867-2468)

NOTE TO EDITORS: N95-36

NASA MANAGERS DELAY LAUNCH OF DISCOVERY, ATLANTIS DATE NOT SET

NASA managers have decided to delay the launch of Space Shuttle Discovery on Mission STS-70 in order to make repairs to foam insulation on the vehicle's external fuel tank. Earlier this week, technicians at Launch Pad 39-B discovered that woodpeckers had inflicted about six dozen small holes in the insulation material.

Due to the critical role the insulation plays from a thermal standpoint during the Shuttle's launch and ascent, and the tank's re-entry into the atmosphere, it was determined that the damaged areas must be fixed prior to flight. After evaluating the location and nature of the areas in question, it was determined the repairs should be performed in the Vehicle Assembly Building (VAB). This is due to access and environmental concerns at the launch pad.

Technicians will now begin preparations for Discovery's rollback to the VAB which may take place the week of June 5. The insulation repair work should take less than a week to complete. Upon completion of the insulation work, Discovery will be moved back to the launch pad for final vehicle preparations. The TDRS/IUS payload will be removed prior to rollback.

With the rollback decision on Discovery, Space Shuttle Atlantis on Mission STS -71, the first Shuttle-Mir mission, will probably be the next mission flown. The STS-71 mission is scheduled for launch during the third week of June.

An official launch date is expected to be announced late next week. A launch date was not selected at the conclusion of today's Flight Readiness Review due to ongoing work aboard the Mir station that needs to be completed prior to Atlantis' arrival. The launch team at the Kennedy Space Center will continue vehicle processing work so that Atlantis will be ready for launch anytime on or after June 22.

-more-

-2-

Shuttle managers are considering various manifest options in terms of which mission will follow the STS-71 flight. There is a flight opportunity scheduled for mid-July and initial indications show another flight could be done in mid-August.

STS-71 is the first of seven planned Space Shuttle-Mir missions between 1995 and 1997, including rendezvous, docking and crew transfers, which will pave the way toward assembly of the international Space Station beginning in November 1997.

- end -

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Video Advisory

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

June 4, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-78

THAGARD SET TO BREAK SKYLAB RECORD FEATURED ON NTV

Monday's NASA TV news file will feature preview footage in preparation for Tuesday when American astronaut Norm Thagard will break the American record for longest continuous mission in space. Thagard has been aboard the Russian Mir space station since mid-March. *The transmission times for the news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: *Breaking Skylab's record*

TRT: 3:00

During the Skylab 4 mission American astronauts logged over 84 days in space. This Tuesday American astronaut Norm Thagard will break that record while living aboard the Russian space station Mir.

ITEM #2: *Norm Thagard's 85th Day*

TRT: 5:00

On May 13 Thagard broke the record for total aggregate time in space (2,017 hours), a compilation of his three previous Shuttle missions and his time on Mir.

ITEM #3: *First American astronaut launches on a Russian Soyuz rocket*

TRT: 5:42

Norm Thagard and Russian cosmonauts Vladimir Dezhurov and Gennadiy Strekalov are shown being launched March 14 from Baikonur, Russia, en route to the Russian Mir space station.

ITEM #4: *Thagard on Mir*

TRT: 3:00

Thagard set to break the American record for time spent in space on single space flight.

ITEM #5: *Inspection of the External Tank of STS-70*

TRT: tbd

NASA technicians inspecting the External Tank of the Space Shuttle Discovery.

ITEM #6: *Woodpecker at pad*

TRT: 1:54

A Flicker woodpecker pecks at the external tank of STS-70. Efforts are being made to keep birds away from the pad.

ITEM #7: *REPLAY -New Mission Control Center at Johnson Space Center*

TRT: tbd

ITEM #8: *REPLAY -Science Module Docks with Mir*

TRT: tbd

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Launius, Roger

From: NASANews
To: press-release-nasa
Subject: Hubble Captures Rare Event as Saturn's Rings Appear Edge-On
Date: Monday, June 05, 1995 2:44PM

Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547) June 5, 1995

Tammy Jones
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-5566)

Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

NOTE TO EDITORS: N95-37

HUBBLE CAPTURES RARE EVENT AS SATURN'S RINGS APPEAR EDGE-ON

In one of nature's most dramatic examples of "now-you-see-them, now-you-don't," NASA's Hubble Space Telescope captured images of Saturn on May 22, 1995 as the planet's magnificent ring system turned edge-on as viewed from Earth. This event occurs about every 15 years.

This observation will be used to determine the time of ring-plane crossing and the thickness of the main rings, to search for as yet undiscovered satellites and to help better determine the rate at which Saturn "wobbles" about its axis in a process known as polar precession.

The image is available to news media representatives by calling the Broadcast & Imaging Branch at 202/358-1900. The NASA photo number is:

B&W: 95-H-310

The image and two others (two three-panel images showing Saturn at three different times around ring-plane crossing, one of which is labeled with names of satellites and times of observation) will be available electronically via the Internet in GIF and JPEG format and may be accessed on Internet via anonymous ftp from ftp.stsci.edu in the /pubinfo directory.

	GIF	JPEG
PRC95-26a Before and during RPC	gif/SatRPC1	jpeg/SatRPC1
PRC95-26b Saturn during RPC	gif/SatRPC3	jpeg/SatRPC3
PRC95-26c Labeled	gif/SatRPC3L	jpeg/SatRPC3L

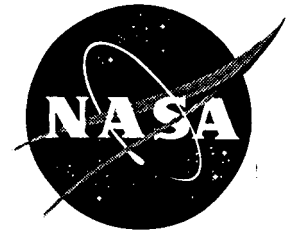
The same images are available via World Wide Web from URL:
<http://www.stsci.edu/Latest.html>, or via links in
<http://www.stsci.edu/public.html>

- end -

News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

Brian Welch
Headquarters, Washington, DC
(Phone: 202/358-1600)

June 5, 1995

NOTE TO EDITORS: N95-38

THAGARD TO TALK TO REPORTERS AS HE BREAKS RECORD

News media at the Johnson Space Center, Houston, and the Kennedy Space Center, FL, will have a chance to talk to U.S. astronaut Norm Thagard aboard the Russian space station Mir as he sets a new American record for time spent in space.

Thagard's news conference from Mir will begin at 11:30 a.m. EDT Tuesday, June 6, and will last approximately 42 minutes. Reporters wishing to ask questions from either JSC or KSC should be in place no later than 10:20 a.m. EDT. Washington area media who wish to monitor the press conference may do so from the NASA Headquarters Newsroom at 300 E St. SW, 8th Floor.

As part of a cooperative U.S.-Russian space mission, Thagard and crew mates Vladimir Deshurov and Gennadiy Strekalov were launched March 14 and arrived at the station two days later. As of June 6, Thagard will have spent 85 days in space.

The previous U.S. record of 84 days was set by Gerald Carr, Edward Gibson and William Pogue on the final Skylab mission from November 16, 1973 to February 8, 1974.

NASA Television will carry the news conference live on Spacenet 2, transponder 5, Channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency is 3880 MHz with audio on 6.8 MHz.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

Video Advisory

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 5, 1995

VIDEO ADVISORY: V95-79

LIVE PRESS CONFERENCE FROM THE MIR ON NTV

Tuesday's NASA TV feed will feature a live press conference from the Mir Space Station on Astronaut Norm Thagard's record breaking day. June 6th marks Thagard's 85th day in space, marking the longest time an American astronaut has spent in orbit since the Skylab program. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT. Note that the press conference from Mir begins at 11:30 am EDT.*

ITEM #1: *Mir Press Conference*

TRT: 42:00

The press conference runs from 11:30 am to 12:12 pm EDT with questions from reporters in Houston and Florida.

ITEM #2: *Breaking Skylab's Record*

TRT: 4:04

During the Skylab 4 mission, astronauts William Pogue, Edward Gibson, and Gerald Carr spent over 84 days in space, and held the record for the longest time in orbit by American astronauts. Norm Thagard is breaking the record on June 6, 1995.

ITEM #3: *Norm Thagard' Aboard Mir*

TRT: 2:56

B-roll of Thagard aboard Mir.

ITEM #4: *First American Astronaut Launches on a Russian Soyuz Rocket*

TRT: 5:42

Astronaut Norm Thagard along with Cosmonauts Vladimir Dezhurov and Gennadiy Streklov, launched March 14 from Baikonur on a Soyuz rocket for a planned 12-week stay on the Mir Space Station

ITEM #5: *Thagard on Mir*

TRT: 1:37

Astronaut Norm Thagard breaks American record for time spent in space on a single space flight. On June 6th he will have spent 85 days in space aboard the Russian Space Station Mir.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

June 6, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-80

IMAGES OF SPRITES ON NASA TV WEDNESDAY

Wednesday's NASA TV news file will open with footage of sprites occurring above storms over Peru last February and March. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Television Images of Sprites

TRT: :70

Images of six sprite events recorded during thunderstorms over Peru in February and March of this year. The first clip is shown at real speed; remaining sequences are at 1/4 speed. Sprites extend up into the atmosphere to altitudes of about 290,000 feet above storms.

ITEM #2: Time Lapse of Storm Evolution and Location of Sprites

TRT: :35

Time lapse movie of the cloud and storm evolution over the 19.5 hours just prior to the sprite observations from Feb. 25. The colors shown indicate the temperature of the sprite, with blue representing warm temperatures (+25 C) and white showing cold (-70 C).

ITEM #3: Time Lapse of Clouds and Sprites

TRT: :20

Time lapse sequence of clouds and location of sprite observed on the evening of Feb. 25. The small storm cell shown on the edge of the main storm with cluster sprites is only about 25 miles in diameter.

ITEM #4: Interview with Davis Sentman on Sprites

TRT: 5:00

Sentman discusses the nature of sprites and the results of the observations made over Peru.

ITEM #5: Propulsion Controlled Aircraft

TRT: 3:00

Using concepts developed at NASA Dryden and aircraft simulators at NASA Ames, pilots have been flying simulated landings of airline-type aircraft using only engine thrust. These simulator tests will help pave the way for future flight research on propulsion controlled aircraft. It is estimated that computer-assisted propulsion controlled aircraft technology can save many lives by allowing for safer aircraft operations.

ITEM #6: Interview with Bill Burcham

TRT: 4:00

Burcham discusses the benefits of using the propulsion controlled aircraft software.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

June 6, 1995
EMBARGOED UNTIL: 2:00 P.M. (EDT)

Tammy Jones
Goddard Space Flight Center, Greenbelt, MD
(Phone: 301/286-5566)

Ray Villard
Space Telescope Science Institute, Baltimore, MD
(Phone: 410/338-4514)

RELEASE: 95-83

HUBBLE OBSERVES THE FIRE AND FURY OF A STELLAR BIRTH

NASA's Hubble Space Telescope has provided a detailed look at the fitful, eruptive, and dynamic processes accompanying the final stages of a star's "construction."

Images from the orbiting observatory reveal new details that will require further refinement of star formation theories, according to several independent teams of astronomers who have used Hubble to observe different embryonic stars. The Hubble observations shed new light on one of modern astronomy's central questions: how do tenuous clouds of interstellar gas and dust make stars like our Sun?

"For the first time we are seeing a newborn star close up -- at the scale of our solar system -- and probing the inner workings," said Chris Burrows of the Space Telescope Science Institute, Baltimore, MD, and the European Space Agency. "In doing so we will be able to create detailed models of star birth and gain a much better understanding of the formation of our Sun and planets."

The Hubble images provide a dramatically clear look at a collapsing circumstellar disk of dust and gas that builds the star and provides the ingredients for a planetary system, blowtorch-like jets of hot gas funneled from deep within several embryonic systems, and machine-gun like bursts of material fired from the stars at speeds of a half-million miles per hour.

- more -

The images offer clues to events that occurred in our solar system when the Sun was born 4.5 billion years ago. Astronomers commonly believe that Earth and the other eight planets condensed out of a circumstellar disk because they lie in the same plane and orbit the Sun in the same direction. According to this theory, when the Sun ignited it blew away the remaining disk, but not before the planets had formed.

"The Hubble images are opening up a whole new field of stellar research for astronomers and clearing up a decade's worth of uncertainty," added Jeff Hester of Arizona State University, Tempe, AZ. "Now we can look so close to a star that many details of star birth become clear immediately."

The key new details revealed by the Hubble pictures:

- * Jets originate from the star and the inner parts of the disk and become confined to a narrow beam within a few billion miles of their source. It's not known how the jets are focused, or collimated. One theory is that magnetic fields, generated by the star or disk, might constrain the jets.
- * Stars shoot out clumps of gas that might provide insights into the nature of the disk collapsing onto the star. The beaded jet structure is a "ticker tape" recording of how clumps of material have, episodically, fallen onto the star. In one case, Hubble allowed astronomers to follow the motion of the blobs and measure their velocity.
- * Jets "wiggle" along their multi-trillion-mile long paths, suggesting the gaseous fountains change their position and direction. The wiggles may result from the gravitational influence of one or more unseen protostellar companions.

More generally, Hester emphasizes: "Disks and jets are ubiquitous in the universe. They occur over a vast range of energies and physical scales, in a variety of phenomena." Gaining an understanding of these young circumstellar structures might shed light on similar activity in a wide array of astronomical phenomena: novae, black holes, radio galaxies and quasars.

"The Hubble pictures appear to exclude whole classes of models regarding jet formation and evolution," said Jon Morse of the Space Telescope Science Institute.

A disk appears to be a natural outcome when a slowly rotating cloud of gas collapses under the force of gravity -- whether the gas is collapsing to form a star, or is falling onto a massive black hole.

Material falling onto the star creates a jet when some of it is heated and blasted along a path that follows the star's rotation axis, like an axle through a wheel.

Jets may assist star formation by carrying away excess angular momentum that otherwise would prevent material from reaching the star. Jets also provide astronomers with a unique glimpse of the inner workings of the star and disk. "Not even the Hubble Telescope can watch as material makes its final plunge onto the surface of the forming star, but the new observations are still telling us much about that process," said Hester.

Burrows, Hester, Morse and their co-investigators independently observed several star birth sites in our galactic neighborhood. "All of these objects tell much the same story," Hester emphasized. "We are clearly seeing a process that is a crucial part of star formation, and not just the peculiarities of a few oddball objects."

The researchers all agree that the Hubble pictures generally confirm models of star formation but will send theorists back to the drawing board to explain the details. The researchers emphasize that future models of star formation will have to take into account why jets are ejected from such a well-defined region in the disk, why jets are collimated a few billion miles out from the star, and why gas in the jets is ejected quasi-periodically.

- end -

EDITOR'S NOTE: Images to illustrate this release are available for news media representatives by calling the Headquarters Broadcast and Imaging Branch on 202/358-1900. Photo numbers are:

Caption description	Color	B&W
Hubble Views of Three Stellar Jets	95-HC-292	95-H-297
Motion Of Jets From An Embryonic Star		95-H-298
Pair of Jets from a Young Star	95-HC-293	95-H-299
Wiggling Jet from a Wobbling Star		95-H-300

Image files in GIF and JPEG format may be accessed on Internet via anonymous ftp from <ftp.stsci.edu> in the /pubinfo directory:

		GIF	JPEG
PRC95-24a	HH30/HH34/HH47	gif/JetDisk3	jpeg/JetDisk3
PRC95-24b	HH30 Jet Motion	gif/HH30	jpeg/HH30
PRC95-24c	HH1/HH2 Details	gif/HH1-2	jpeg/HH1-2
PRC95-24d	HH47 Jet Detail	gif/HH47	jpeg/HH47

The same images are available via World Wide Web from these URL locations:

http://www.nasa.gov/hqpao/hqpao_home.html under "Pick of The Pix"

<http://www.stsci.edu/Latest.html>, or via links in

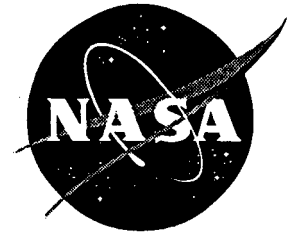
<http://www.stsci.edu/public.html>.

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

For Release

June 7, 1995

Rob Navias
Johnson Space Center, Houston
(Phone: 713/483-5111)

NOTE TO EDITORS: N95-39

NASA MANAGERS SET LAUNCH DATES FOR DISCOVERY AND ENDEAVOUR

NASA managers have set new target launch dates for two Shuttle missions scheduled to fly this summer. Space Shuttle Discovery on Mission STS-70 is now targeted for launch on July 13 and Space Shuttle Endeavour is set to be launched on Mission STS-69 on July 30.

The new flight dates for Discovery and Endeavour have no impact to the processing work on Space Shuttle Atlantis being prepared for the STS-71 launch on the first Shuttle-Mir docking mission. The Atlantis launch remains planned for no earlier than June 22 and a firm launch date may be announced early next week.

The new target launch dates for Discovery and Endeavour were established after the launch team finished assessing the impact of last week's decision to roll Discovery off Launch Pad 39-B. The rollback was required in order to make repairs to the foam insulation on the external tank.

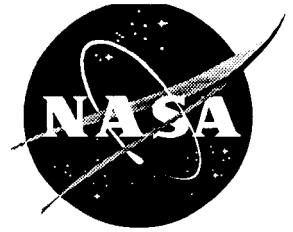
- end -

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Video Advisory

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(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 7, 1995

VIDEO ADVISORY: V95-81

RUSSIAN MIR-SHUTTLE DOCKING HARDWARE ARRIVES AT KSC

Thursday's NASA TV news file will open with footage of the arrival at the Kennedy Space Center, FL, of Russian made Mir docking hardware that will be used to support docking between the Mir and American Space Shuttles. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Russian Docking Module Arrives at Kennedy Space Center TRT: 4:00

The Russian Docking Module and a pair of solar arrays for the Mir Space Station arrive at the Kennedy Space Center Shuttle Landing Facility aboard an Aeroflot Antonov-124 cargo plane. The module will be attached to the Mir space station as an Orbiter interface for future Shuttle/Mir docking missions.

ITEM #2: REPLAY - Television Images of Sprites TRT: :70

Images of six sprite events recorded during thunderstorms over Peru in February and March of this year. The first clip is shown at real speed; remaining sequences are at 1/4 speed.

ITEM #3: REPLAY - Time Lapse of Storm Evolution and Sprites TRT: :35

Time lapse movie of the cloud and storm evolution over the 19.5 hours just prior to the sprite observations from Feb. 25.

ITEM #4: REPLAY - Time Lapse of Clouds and Sprites TRT: :20

Time lapse sequence of clouds and location of sprites observed on the evening of Feb. 25.

ITEM #5: REPLAY - Interview with Davis Sentman on Sprites TRT: 5:00

Sentman discusses the nature of sprites and the results of the observations made over Peru.

ITEM #6: REPLAY - Propulsion Controlled Aircraft TRT: 3:00

Using concepts developed at NASA Dryden and aircraft simulators at NASA Ames, pilots have been flying simulated landings of airline-type aircraft using only engine thrust. These simulator tests will help pave the way for future flight research on propulsion controlled aircraft.

ITEM #7: REPLAY - Interview with Bill Burcham TRT: 4:00

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

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News Release

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Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

For Release

June 7, 1995

Kathy Berry
Geophysical Institute, University of Alaska, Fairbanks
(Phone: 907/474-7798)

RELEASE: 95-84

SPRITES CONFIRMED OVER STORMS OUTSIDE U.S. FOR FIRST TIME

NASA researchers have captured on videotape the first conclusive evidence that the mysterious flashes of red light called sprites -- which extend up to 55 miles above electrical thunderstorms -- are not limited to the United States.

The research team from the Geophysical Institute of the University of Alaska, Fairbanks, recorded the unusual flashes above thunderstorms near the equator in South America last February and March. Previously, they had seen the recently discovered sprites above storms only in the U.S., leading some scientists to question whether or not they occur in other parts of the world.

Geophysical Institute researchers Davis Sentman, Gene Wescott and Daniel Osborne used special low-light-level cameras aboard a Westwind-2 jet aircraft to record the brief flashes. The flights, part of a NASA-sponsored investigation into the phenomenon, were coordinated with the Peruvian Air Force. The researchers recently completed an analysis of the footage gained during their flights.

In form and in visual appearance, the sprites over South America look similar to flashes recorded by the team over storms in the central U.S. last summer. About 500 sprites were recorded last June and July, many on color video for the first time. None of the sprite groups seen this winter over South America were as large or as intense in color as some of the larger groups recorded over the U.S.

Less intense thunderstorms may have contributed to the smaller number and desultory appearance of the sprites in South America. In the southwestern-central U.S., the storms form along a quickly moving frontal system, but the convective storms in South America are nearly stationary; they tend to grow in place, develop slowly into large systems like boiling water, then dissipate.

- more -

Some scientists had speculated that sprites might not exist over equatorial regions because thunderstorms there frequently do not get larger than about 100 miles, which some thought was the minimum size needed to produce a sprite.

Pilots and others also have reported seeing blue or greenish columns propagate upward at great speed from the top of thunderstorms. Wescott and Sentman were the first to report the video capture and the characteristics of "blue jets" from 1994 flights over the U.S. No blue jets were seen over South America.

Sprites can be seen from the ground after dark with the unaided eye under the right conditions. To encourage pilots and others to report sprite sightings around the world, Sentman is establishing a Sprite Watcher's Homepage on the World Wide Web. The homepage will give brief information about sprites, the conditions needed to view sprites from the ground or air, and simple directions to follow when recording a sighting. All public sightings will be incorporated into a scientific database, and then displayed on a global map for Web users.

Researchers from government laboratories, universities, and Federal agencies will continue to investigate sprites and other phenomena associated with thunderstorms this summer during two main campaign efforts. A team from the Geophysical Institute will observe storms from Colorado mountain tops to support optical observations of sprites made from the Yucca Ridge Field State east of Fort Collins, CO. Research into what causes sprites will be made using radio frequencies, radar, and other measuring techniques at additional sites across the eastern half of the U.S.

More than two dozen scientists from across the country will participate in a second major campaign, which will focus on thunderstorms around northern Florida. Facilities and capabilities at NASA's Kennedy Space Center will be used in the study.

-end-

EDITOR'S NOTE: Individuals interested in participating in the sprite research or receiving further information via the internet can access the Sprite Watchers Homepage at the following URL: <http://elf.gi.alaska.edu/>

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

June 7, 1995

RELEASE: 95-85

STUDENTS SELECTED FOR NASA SCIENCE TRAINING PROGRAM

Forty college students have been chosen by NASA to participate in an intensive six-week life sciences summer residence training program at the Kennedy Space Center, FL. The program is for undergraduate college students majoring in life sciences, bioengineering and related science and engineering fields.

Now in its 10th year, the Space Life Sciences Training Program (SLSTP) is designed to attract college students to a career in space life sciences research. Participants will gain insight into how space life sciences flight experiments are conducted, as well as explore current and future research opportunities.

Selected students will work with NASA researchers in developing flight and ground-based space life sciences experiments. In addition to offering hands-on research experience, the curriculum provides a complete overview of the field of space life sciences through lectures by astronauts, as well as NASA and university scientists, and includes facility tours and special projects.

On occasion the students may have an opportunity to participate in the preparation and monitoring of actual Space Shuttle flight experiments. The SLSTP will be held from mid-June through the end of July.

After the successful completion of the program, five semester hours of college credit will be offered to each student through Florida A&M University, which also is responsible for program promotion, student recruitment, selection, travel, housing, program evaluation and academic consultation.

The 40 students were selected competitively from approximately 500 applicants. Students in the program must be undergraduates majoring in science or engineering and have a minimum cumulative grade point average of 3.0/4.0. More than 360 students have participated in the program since its inception in 1985.

-more-

SLSTP is sponsored by NASA's Office of Life and Microgravity Sciences and Applications and the Office of Human Resources and Education.

The students selected for the 1995 Space Life Sciences Training Program are:

Student	Hometown	College
Kineshia K. Abram	Columbia, MS	Jackson State U.
Lori A. Amason	Centralia, IL	Kaskaskia Jr. College
Robert W. Amerine	Colorado Springs, CO	Colorado State U.
Ellen Burts	Birmingham, AL	Stillman College
Matthew J. Carfrae	Cedar Rapids, IA	Marquette U.
Anita A. Chandrathil	Des Plaines, IL	U. of IL, Urbana-Champaign
Myron A. Chornuk	Seattle, WA	U. of Washington
Calvin N. Collins	Tampa, FL	Hills Borough Comm. College
Kathryn M. Davis	Longview, TX	Texas A&M U.
Alisha B. Diggs	New Orleans, LA	Xavier U.
Lynn M. Evans	Pewee Valley, KY	Wittenberg U.
Mark G. Fagan	Hanna, WY	Wesleyan U.
Jill A. Gogel	Dale, IN	Purdue U.
Brian E. Grace	Nortonville, KY	Western Kentucky U.
George R. Hamilton	Rochester, NY	SUNY at Buffalo
Shelly Harper	Omaha, NE	Embry-Riddle Aeronautical U.
Clay H. Holdsworth	Wilbraham, MA	U. of Massachusetts
Felix A. Irizarry	Aquadilla, PR	U. of Puerto Rico
Christopher D. Jackson	Decatur, GA	Florida A&M U.
Claudine L. Joyner	Cleveland, TN	Cleveland State Comm. College
Bryan D. Lambird	El Toro, CA	U. of Southern CA
Amy J. Litscher	Lake Mills, WI	Beloit College
Belise L. Livingston	Deltona, FL	Spelman College
Justin R. Lohmeier	Jackson, MS	U. of Virginia
Kennda L. Lynch	Rockford, IL	U. of IL, Urbana-Champaign
Gioia D. Massa	Big Arm, MT	Cornell U.
Suzanne K. Paris	Spring, TX	North Harris College
Eric E. Peterson	Napa, CA	Napa Valley College
Shawn W. Pyle	Finley, TN	Dyersburg State Comm. College
Demario L. Rollins	Tallahassee, FL	Florida A&M U.
Joy J. Serogum	Canton, IL	U. of IL, Urbana-Champaign
Kathleen H. Sienko	Endicott, NY	U. of Kentucky

-more-

Amy P. Synder	Upper St. Clair, PA	Cornell U.
Ee T. Tay	Palm Bay, FL	U. of Florida
Donna L. Todacheene	Lukachukai, AZ	Haskell Indian Nations U.
Nirav N. Vakharia	Westlake, OH	Case Western Reserve U.
Brian H. Wayman	Hillsboro, MD	U. of Maryland Baltimore County
Valerie S. Weidner	University Park, MD	Duke U.
James B. Wohlwend	Derby, KS	Friends U.
Heidi A. Zeleznik	Myrtle Beach, SC	Coastal Carolina U.

- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

June 8, 1995

VIDEO ADVISORY: V95-82

40TH ANNIVERSARY OF THE B-52 ON NASA TELEVISION FRIDAY

Friday's NASA TV video news file will open with footage and interviews commemorating the the 40th anniversary of the first flight of NASA's B-52 aircraft. The venerable airplace, the eighth to roll off the B-52 assembly line, has been used in a number of historic experimental flight programs. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: The B-52 Turns 40

TRT: 3:00

Historic and current footage of NASA's B-52, which celebrates it's 40th anniversary of flight on June 11.

ITEM #2: Interview with Gordon Fullerton, NASA pilot and astronaut

TRT: 1:37

Fullerton, a NASA research pilot and former astronaut explains the challenges of flying the B-52 and the differences between it and today's aircraft.

ITEM #3: Interview with Roy Bryant, NASA B-52 Project Manager

TRT: 3:48

Bryant talks about the aircraft's place in history and the contribution it has made in U.S. aeronautical development.

ITEM #4: Interview with Ed Schneider, NASA Research Pilot

TRT: 3:07

Schneider discusses the B-52's special significance as an aircraft, as well as the fun and frustration of flying a 40-year-old aircraft.

ITEM #5: REPLAY - Russian Docking Module Arrives at KSC

TRT: 4:00

ITEM #6: REPLAY - Television Images of Sprites

TRT: :70

ITEM #7: REPLAY - Time Lapse of Storm Evolution and Sprites

TRT: :35

ITEM #8: REPLAY - Time Lapse of Clouds and Sprites

TRT: :20

ITEM #9: REPLAY - Interview with Davis Sentman on Sprites

TRT: 5:00

ITEM #10: REPLAY - Propulsion Controlled Aircraft

TRT: 3:00

ITEM #11: REPLAY - Interview with Bill Burcham

TRT: 4:00

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

NewsRelease

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Ray Castillo
Headquarters, Washington, DC
(Phone: 202/358-4555)

For Release
June 8, 1995

Kari Fluegel
Johnson Space Center, Houston
(Phone: 713/483-8649)

George Diller
Kennedy Space Center, FL
(Phone: 407/867-2468)

RELEASE: 95-86

RUSSIAN DOCKING MODULE, SOLAR ARRAYS ARRIVE IN FLORIDA

A Russian cargo plane has delivered equipment for the second Shuttle/Mir docking mission -- a major exchange of space flight components between the United States and Russia. During assembly of the international Space Station, this type of cooperative exchange will take place frequently.

An Antonov An-124 cargo plane, the equivalent of a U.S. C-5 cargo plane, landed at NASA's Kennedy Space Center, FL at 10:40 a.m. EDT yesterday. The delivered cargo included a Shuttle-to-Mir docking module, the module's ground support equipment, a portion of the docking module training mockup for use in crew contingency spacewalk training, and two solar arrays for the Russian Mir space station.

"This is a major operational hardware exchange between the United States and Russia," said Tommy Holloway, manager of NASA's international Space Station Phase One Program Office. "As we move into the Space Station era, these equipment exchanges will become almost commonplace. This particular hardware also is very important to the reconfiguration of Mir for future joint operations."

The docking module, which will be carried to space aboard the Space Shuttle Atlantis on the STS-74 mission later this year, is designed to improve the clearances for the Shuttle during future docking operations with the Russian space station Mir.

-more-

During STS-74, Atlantis astronauts will use the Orbiter's robotic arm to place the docking module onto the Orbiter Docking System. On the third day of that flight, Mission Commander Ken Cameron will ease the Orbiter up to Mir so that a link-up occurs with the docking module serving as a bridge between the two space vehicles. When Atlantis leaves Mir after three days of joint operations, the undocking procedures will disconnect the Orbiter Docking System from the docking module, leaving it attached to the station for use on future missions.

Before the docking module is loaded onto Atlantis, it will be prepared for flight in the Space Station Processing Facility (SSPF) at the Kennedy Space Center; it is the first piece of hardware to be processed in the SSPF. The docking module will undergo a complete systems checkout and the two solar arrays and a trunnion assembly will be attached to the module. The activity will be monitored by a team from the Russian organization RSC Energia.

The two solar arrays will be used to extend Mir's lifetime and support U.S. science and technology research. One of the arrays was built as a cooperative project between the U.S. and Russia, combining proven Russian structures and mechanisms with advanced U.S. solar array modules. The second array is composed of all Russian components. The solar arrays will be stowed on the side of the docking module for transport to Mir and will be installed some time after the completion of STS-74.

After SSPF processing, the docking module and solar arrays will be transferred to the Operations and Checkout Building. The module will then undergo a series of tests to verify electrical and mechanical compatibility with the Orbiter.

The docking module training mockup will be shipped to the Johnson Space Center. Astronauts will use it for extravehicular activity training in the Neutral Buoyancy Tank. No spacewalk is planned for the STS-74 mission, but crew members will practice several backup procedures that will be employed if problems occur with the module during the flight. The remaining sections of the training mockup will be shipped from Russia later this year to support spacewalk training for STS-76, the third docking mission.

-end-

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Don Nolan-Proxmire
Headquarters, Washington, DC
(Phone: 202/358-1983)

June 9, 1995

Lori J. Rachul
Lewis Research Center, Cleveland, OH
(Phone: 216/433-8806)

RELEASE: C95-i

NASA SELECTS RESEARCH GROUP TO BOOST U.S. COMPETITIVENESS

A Cooperative Agreement has been signed by NASA and a research consortium headed by United Technologies, Pratt & Whitney Group, to develop aircraft propulsion applications that will give a network of small computers the capabilities of a super computer.

The alliance reflects a recent NASA initiative utilizing cooperative agreements in joint ventures to conduct computer research.

"This cooperative agreement has produced a powerful team from industry, academia and government that will integrate advanced aeropropulsion, computing and communications technologies to help the United States maintain its world leadership in aeropropulsion," said Dr. John K. Lytle, chief of Lewis Research Center's Interdisciplinary Technology Branch.

Distributed computing is the thrust of NASA's Affordable High Performance Computing Project (AHPCP), an effort which focuses on specific requirements of the U.S. aerospace community and enhances the Nation's competitiveness. This effort will concentrate on research and development in novel aircraft jet engine computer simulations, supporting high-risk and high-payoff opportunities that demonstrate strong potential for commercial benefits of NASA technology.

The total value of the joint venture is \$8.4 million including \$4 million direct NASA funding to conduct research under the program. In addition to United Technologies, Pratt & Whitney Group, East Hartford, CT, consortium members are CFD Research, Huntsville, AL; Platform Computing, Newbury, MA; MacNeal Schwendler Corp., Los Angeles, CA; Massachusetts Institute of Technology, Cambridge, MA; and State University of New York, Buffalo, NY.

- more -

- 2 -

As NASA's Center of Excellence in Aeropropulsion, Lewis Research Center, Cleveland, OH, will work jointly with the Pratt & Whitney team to apply high performance computing technologies to reduce design cycle time for aircraft jet engine compressors. This research will lead to substantial increases in performance and reductions in development cost. NASA's Ames Research Center, Moffett Field, CA, and NASA's Langley Research Center, Hampton, VA, also will participate in this research, with a focus on system software development.

- end-

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News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

Don Nolan-Proxmire
Headquarters, Washington, DC
(Phone: 202/358-1983)

June 9, 1995

Don Haley
Dryden Flight Research Center, Edwards, CA
(Phone: 805/258-3449)

RELEASE: 95-89

40TH ANNIVERSARY ARRIVES FOR NASA B-52

Life hasn't "just begun at 40" for NASA's oldest aircraft. It keeps getting better.

It's been four decades since the first flight of NASA's B-52. Built as a bomber, the aircraft was the eighth B-52 assembled by Boeing. It rose into the air for the first time on June 11, 1955.

But the aircraft didn't become a Cold War weapon like its sister ships. Based at the Dryden Flight Research Center, Edwards, CA, since mid-1959 and on extended loan to NASA since 1976, it has, instead, been a vital part of many projects that have kept the United States at the forefront of aerospace development. This role has quietly made the aircraft, tail number 008, the most celebrated B-52 of all -- and the oldest one on flight status anywhere, and the end is not yet in sight.

On the right side of the aircraft's fuselage, scores of symbols stenciled on the aluminum skin record the aircraft's history and mirror many significant projects of the past.

• After a four-year tour as an Air Force test aircraft, 008 became one of two B-52s modified as aerial launch platforms for the X-15 research program. Of the 199 flights in the highly successful program, 106 originated from the wing pylon of 008. It's been 26 years since the final X-15 mission at Dryden, but the rocket-powered aircraft still holds the speed (4,520 mph) and altitude records (354,200 ft) for winged aircraft. The other B-52, tail number 003, was retired from service in 1968.

-more-

- Using the same pylon from 1966 to 1975, 008 was the launch aircraft for 128 of the 144 flights of wingless lifting bodies that contributed to the development of the Space Shuttle.

- In 1977 and 1978, and again from 1983 to 1985, 008 was the launch aircraft to test and develop the parachute recovery system on the Space Shuttle's solid rocket booster casings.

- Space Shuttle drag chute tests were conducted by 008 in 1990, broadening the operational capabilities of the reusable Orbiters.

- 008 was the launch aircraft for several remotely piloted aircraft flown at Dryden in the 1970s and 1980s to study spin-stall, high angle of attack, and maneuvering characteristics. They were the sub-scale F-15 spin research vehicle; the HiMat (Highly Maneuverable Aircraft Technology) research aircraft; and the DAST (Drones for Aerodynamic and Structural Testing), used to study the ability of advanced flight control systems to control wing flutter conditions.

- Over a period of 15 years, 008 was used to drop F-111 aircraft crew escape module test articles to help develop and certify the operational life of the modules' parachute recovery systems.

- 008, as the launch platform for the first six Pegasus space booster missions, is the first aircraft to send a satellite into Earth orbit.

"It's a special treat to be able to fly a famous airplane like this," said Gordon Fullerton, former astronaut and one of three NASA pilots at Dryden who fly the eight-engine aircraft. "It's a straight-forward and honest airplane. It's a challenge to fly, but there's a lot of satisfaction in flying it, too."

The other two B-52 pilots are Ed Schneider and Jim Smolka.

Schneider says being an amateur historian gives special meaning to his B-52 piloting job.

"This airframe has transcended four decades, through the Korean War and the Cold War, and it's still a very productive airplane," reflects Schneider. "Being able to fly it is very special for me."

Today, the big swept-wing aircraft, 156 feet long with a wingspan of 185 feet, is being used in a high atmospheric research project.

The future for 008 is also bright. It is being studied as the launch platform for tests of the X-35, a planned piloted reusable spacecraft to give astronauts a quick and easy way to return to Earth from the future Space Station.

Roy Bryant, Dryden's B-52 project manager, calls 008 "a very versatile and accessible aircraft, with the capability of adding greatly to the nation's technology base to the end of the decade."

"Other heavy-lift aircraft can carry more weight and fly faster," said Bryant, "but our modifications -- the ability to air launch research vehicles and test articles -- make this airplane special. It's a very big part of NASA's history."

Crew chief Dan Bain said the maintenance team looks at the aircraft with pride because of its historical significance.

"It's the last of its kind and we're all real proud to work on it," said Bain. "It's an honor because there's no other airplane like it in the world."

Research pilot Jim Smolka echoes the praise for the B-52 maintenance effort.

"I have a lot of respect for the maintenance guys. It's not an easy airplane to maintain," said Smolka. "There are many old parts on it -- tubes instead of transistors -- and some parts have to be scavenged from museum B-52s around the country. But we very seldom have a problem with the airplane."

Not bad for middle age. But then 008 has only 2285 hours of flying time, the lowest in the entire B-52 fleet. If 008 was ever found on a used airplane lot, it would be the best buy in town.

-end-

EDITOR'S NOTE: Images to illustrate this release are available for news media representatives by calling the Headquarters Broadcast and Imaging Branch on 202/358-1900. Photo numbers are:

90-HC-559 color 90-HC-612 black and white
89-HC-42 color

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

June 11, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)
VIDEO ADVISORY: V95-83

ASTRO-2 MISSION DISCOVERIES UNVIELED ON NTV MONDAY

Monday's NASA TV video news file will feature new astronomical imagery gathered during the ASTRO-2 Space Shuttle mission, flown aboard Endeavour in March 1994. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Evolving Stars

TRT: :30

The globular cluster NGC 6752 as seen in ultraviolet light. The 355 stars seen in the Ultraviolet Imaging Telescope image are in a short-lived stage near the end of their lives known as the horizontal branch phase. This image provides the first complete census of the stars in this phase.

ITEM #2: Spiral Galaxy M101

TRT: :30

An ultraviolet image of the giant spiral galaxy with a small central bulge and a system of spiral arms that is not tightly wound, at a distance of about 16 million light years from the Earth.

ITEM #3: The Starburst Galaxy

TRT: :30

A giant ring of hot, young stars appears in the ultraviolet image (top) of the spiral galaxy, Messier 94. In red (bottom), three distinct zones are shown -- a bright central bulge, composed mostly of old, cold stars; the main disk showing many spiral arms; and an extensive, faint outer ring.

ITEM #4: Small Magellanic Cloud

TRT: :30

This is a mosaic of four ultraviolet photographs of the Small Magellanic Cloud (SMC). The SMC is an irregular galaxy and a near neighbor to our Milky Way galaxy.

ITEM #5: Large Magellanic Cloud

TRT: :30

Image of an arc of hot stars in the star-forming region N-51. This region contains at least five clusters of young, massive stars which have lifetimes of only a few million years.

ITEM #6: Interview - Dr. Susan Neff

TRT: 2:27

Neff explains how the Ultraviolet Imaging Telescope, flown on the ASTRO-2 mission, verifies how different the universe looks in ultraviolet light as compared to visible light.

ITEM #7: Big Bang Animation Stills

TRT: :55

Astronomers using NASA's Astro-2 observatory detected one of two original building blocks of the universe -- the element helium created in the Big Bang Explosion. The last still shows the quasar, about 10 billion light years away, in which scientists were able to detect helium.

ITEM #8: Astro-2 Mission B-Roll

TRT: :54

Hopkins Ultraviolet Telescope scientists await data from their telescope during the Astro-2 Shuttle mission.

ITEM #9: Interview - Arthur Davidsen

TRT: 1:58

The Principal Investigator of the Hopkins Ultraviolet Imaging Telescope explains the importance of the detection of an intergalactic medium, a gas created in the Big Bang.

ITEM #10: Media Tour of the Johnson Space Center, Houston

TRT: tbd

Media tour of the Johnson Space Center sponsored by the producers of the movie "Apollo 13."

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 12, 1995

VIDEO ADVISORY: V95-84

GAMMA RAY BURSTS EXAMINED ON NASA TV TUESDAY

Tuesday's NASA TV video news file will feature new animation and interviews examining gamma ray bursts as viewed by NASA's Burst and Transient Source Experiment (BATSE), an instrument aboard the orbiting Compton Gamma Ray Observatory. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Gamma Ray Burst animation **TRT: 1:00**

Animation of gamma ray bursts, one of the most mysterious phenomena in astronomy.

ITEM #2: BATSE Operations Center **TRT: 3:00**

Scientists at the BATSE center analyze data from the Compton Gamma-Ray Observatory, launched in April 1991.

ITEM #3: Interview with Dr. Geoffrey Pendleton **TRT: 1:19**

Pendleton explains what gamma ray bursts are and where they may originate. Pendleton is a professor at the University of Alabama and an investigator on the BATSE team.

ITEM #4: Interview with Dr. Gerald Fishman **TRT: 1:47**

Fishman, BATSE Principal Investigator, discusses the mystery of gamma ray bursts and the theories behind them.

ITEM #5: REPLAY - Evolving Stars **TRT: :30**

ITEM #6: REPLAY - Spiral Galaxy M101 **TRT: :30**

ITEM #7: REPLAY - The Starburst Galaxy **TRT: :30**

ITEM #8: REPLAY - Small Magellanic Cloud **TRT: :30**

ITEM #9: REPLAY - Large Magellanic Cloud **TRT: :30**

ITEM #10: REPLAY - Interview - Dr. Susan Neff **TRT: 2:27**

ITEM #11: REPLAY - Big Bang Animation Stills **TRT: :55**

ITEM #12: REPLAY - Astro-2 Mission B-Roll **TRT: :54**

ITEM #13: REPLAY - Interview - Arthur Davidsen **TRT: 1:58**

-end-

News Release

National Aeronautics and
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Washington, DC 20546
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For Release

Don Savage
Headquarters, Washington, DC
(Phone: 202/358-1547)

June 12, 1995

Emil Venere
Johns Hopkins University, Baltimore, MD
(Phone: 410/516-7160)

RELEASE: 95-87

ASTRO-2 PROVIDES FIRST DEFINITIVE DETECTION OF PRIMORDIAL HELIUM

Astronomers using NASA's Astro-2 observatory today announced the first definitive detection of one of the two original building blocks of the universe -- the element helium created in the Big Bang explosion.

The finding that the chemical element helium is widespread in the early universe confirms a critical prediction of the Big Bang cosmological theory and provides clues to several other major mysteries in astronomy.

The announcement was made by Dr. Arthur Davidsen of Johns Hopkins University, Baltimore, MD, at a meeting of the American Astronomical Society in Pittsburgh, PA. Davidsen is the Principal Investigator for the Hopkins Ultraviolet Telescope (HUT), one of three ultraviolet (UV) instruments on the Astro-2 observatory which was operated in the payload bay of the Space Shuttle Endeavour during a 17-day mission in March of this year.

"It's a very rewarding feeling to find that we actually have achieved what we set out to do at the beginning of the project 17 years ago," said Davidsen, a professor in the Johns Hopkins Department of Physics and Astronomy. "It certainly helps confirm the Big Bang."

"This long-sought primordial helium represents a major milestone in astronomy and is the most significant achievement for the very successful Astro-2 mission," said Dr. Daniel Weedman, Director of NASA's Astrophysics Division in Washington, DC.

The data enabled scientists to estimate the abundance of helium and hydrogen in the primordial universe, confirming predictions made by the standard Big Bang theory as to how much gas was produced at the beginning of the universe.

-more-

The observation also has allowed astronomers to detect a portion of the invisible "dark matter" in the early universe, a discovery that might shed light on what constitutes some of the "missing mass" in today's universe.

Confirming the Big Bang Theory

The findings matched an important prediction of the Big Bang theory -- that a primordial mixture of helium and hydrogen was created at the birth of the universe. By showing that significant amounts of helium existed in the early universe, the discovery reaffirms the theory that the chemical elements hydrogen and helium were formed in the first three minutes after the Big Bang. The heavy elements, (carbon, nitrogen, oxygen, silicon, iron, etc.) come from nuclear reactions in the centers of stars, and thus didn't form until some time after the Big Bang.

Davidson said HUT's mission on Astro-2 was the culmination of his goal, conceived 17 years ago, to find the hypothetical "primordial intergalactic medium" created by the Big Bang. He reasoned that astronomers should be able to detect the helium gas by using a spectrograph in space to measure within a range of light called the far ultraviolet spectrum.

Hopkins astronomers were able to detect the helium by analyzing far ultraviolet light from a distant quasar called HS1700+64, about 10 billion light years away. By observing such a remote object, astronomers were essentially looking back to a time when the universe was less than a quarter of its present age, a time when most of the original hydrogen and helium gas produced by the Big Bang had not yet condensed into stars and galaxies.

As ultraviolet light from the quasar shines through the vast intervening space, it also shines through the intergalactic medium of hydrogen and helium, like a headlight through fog. Intense radiation from early galaxies and quasars completely ionized the hydrogen (stripped the hydrogen atoms of their single electrons), making hydrogen atoms invisible to detection by spectroscopy because they cannot absorb any of the quasar's light. But helium atoms in their natural state have two electrons; some helium atoms retained an electron despite the ionizing radiation, and HUT was able to detect the small portion of helium atoms that were not fully ionized.

From the data collected, astrophysicists are able to calculate how much total intergalactic helium and hydrogen may exist. The degree of helium absorption detected by the spectrograph suggests that a massive amount of gas was present in the intergalactic medium about 10 billion years ago.

"We are only seeing the tail of the dog," Davidson said. "It's enough of a tail to know that it's a very big dog."

Astronomers have been searching for the primordial gas for 30 years, ever since astrophysicists James P. Gunn and Bruce Peterson first postulated that scientists should be able to detect the hydrogen originally created in the Big Bang by analyzing the light from quasars, the most luminous objects in the universe.

But scientists, using a variety of telescopes and instruments, were not able to detect the primordial hydrogen and concluded that it may have been completely ionized by intense radiation. To detect the primordial medium, astronomers decided to focus on the helium instead.

A major stumbling block in confirming the intergalactic medium's existence has been the technical difficulty involved in detecting the helium. The far ultraviolet spectral range is best suited to the search for the intergalactic medium because it enables astronomers to study quasars that are just the right distance from Earth: they are not so far away that their light is heavily "contaminated" by galaxies in the foreground, yet they are distant enough that their light is stretched into the proper redshift to be observed.

The HUT data also appear to have provided a partial answer to the puzzle of dark matter. The observable universe adds up to no more than one percent of the mass required to produce the gravitational force that seems to be present. The standard Big Bang theory predicts that a portion of the remaining, unseen mass is in the form of normal, or baryonic matter -- the stuff people and planets are made of. Theories suggest that up to 10 percent of the missing mass is baryonic, and the rest is possibly some form of exotic matter -- perhaps a variety of unknown subatomic particles that are difficult to detect. Calculations based on HUT's data show that the primordial hydrogen and helium are about equal to the total amount of baryonic dark matter scientists believe exists, Davidsen said.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Dwayne Brown
Headquarters, Washington, DC
(Phone: 202/358-1600)

For Release
June 13, 1995

NOTE TO EDITORS: N95-40

ASTRONAUT BERNARD HARRIS TO RECEIVE ACHIEVEMENT AWARD

NASA astronaut Dr. Bernard Harris, the first African American to walk in space, will receive the Dr. Calvin W. Rolark Achievement Award, a proclamation and key to the city from Washington DC's mayor, Marion Barry, at the United Black Fund's Annual Victory Luncheon on Thursday, June 15. The luncheon will take place from 12-1:30 p.m. at the Sheraton Washington Hotel, 2660 Woodley Rd., N.W., Washington, DC.

During the luncheon, Dr. Harris will address the audience of 1600 people, including 60 students from the District of Columbia Public School system. Ms. Skylar Byrd, the DC student from Benjamin Banneker Academic School who recently received a perfect score on her SAT tests, will be among the guests.

-end-

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)
VIDEO ADVISORY: V95-85

For Release

June 13, 1995

KUIPER BELT, MARS PATHFINDER MISSION ON NTV WEDNESDAY

A comet "breeding" region of the Solar System known as the Kuiper Belt, as well as a review of the Mars Pathfinder Mission, will be featured on Wednesday's news feed.

The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.

- | | |
|--|------------------|
| ITEM #1: Kuiper Belt animation | TRT: 2:00 |
| Animation pulls out from the Sun to reveal the solar system surrounded by the Kuiper Belt. | |
| ITEM #2: Comets from the Kuiper Belt | TRT: :30 |
| Still pictures of seven comets from the Kuiper Belt. | |
| ITEM #3: Comets impacting Jupiter | TRT: :25 |
| Comet fragments from the Kuiper Belt crash into Jupiter's night side. | |
| ITEM #4: Interview with Anita Cochran | TRT: 3:00 |
| Cochran explains what the Kuiper Belt is and how the Hubble Space Telescope has helped scientists see smaller object than ever before from the region. | |
| ITEM #5: Interview with astronomer Eugene Shoemaker | TRT: 1:00 |
| Shoemaker expresses his excitement about the new observations of comets in the Kuiper Belt. | |
| ITEM #6: Mars Pathfinder animation | TRT: 1:30 |
| Animation of the Mars Pathfinder mission designed to deliver a lander, camera and instrument-laden rover to the Martian surface in 1997. The Mars Pathfinder has successfully completed an initial series of engineering tests to validate the spacecraft's unique landing requirements. | |
| ITEM #7: Mars Pathfinder Testing | TRT: 2:30 |
| Footage of the Mars Pathfinder testing, including the parachute descent, rocket firing and airbag deployment. | |
| ITEM #8: Interview with Brian Muirhead | TRT: 3:30 |
| Muirhead, Mars Pathfinder Flight Systems Manager, discusses the objectives of the mission and explains plans for the landing of the vehicle on Mars. | |
| ITEM #9: Interview with Rob Manning | TRT: 2:00 |
| Manning, Mars Pathfinder Flight Systems Chief Engineer, explains the importance of the parachute that will be used to bring the vehicle gracefully through the thin Martian atmosphere. | |
| ITEM #10: Interview with Dr. Les Compton | TRT: 1:15 |
| Compton, Mars Pathfinder Rocket Deceleration Systems Engineer, discusses the testing of rockets that will be used for final breaking in the last seconds before Pathfinder touchdown on Mars. | |
| Item #11: Interview with Tom Rivellini | TRT: 2:25 |
| Airbag Subsystem Engineer Rivellini discusses the airbag testing. Airbags will be attached to the outside of each of the lander's four metallic exterior petals and will cushion landing. | |
| ITEM #12: REPLAY - Gamma Ray Burst animation | TRT: 1:00 |
| ITEM #13: REPLAY - BATSE Operations Center | TRT: 3:00 |
| ITEM #14: REPLAY - Interview with Dr. Geoffrey Pendleton | TRT: 1:19 |
| ITEM #15: REPLAY - Interview with Dr. Gerald Fishman | TRT: 1:47 |

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News Release

National Aeronautics and
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Washington, DC 20546
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For Release

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June 13, 1995

Debbie Rahn
Headquarters, Washington, DC
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Kyle Herring
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-90

CREW SELECTED FOR SHUTTLE MISSION STS-77 ABOARD ENDEAVOUR

Air Force Colonel John H. Casper will command a nine-day mission aboard Endeavour next spring to deploy and retrieve a science satellite and conduct experiments in a pressurized module in the payload bay.

Joining Casper will be Pilot Curtis L. Brown, Jr. (Lt. Col., USAF), and Mission Specialists Daniel W. Bursch (Commander, USN), Mario Runco, Jr., Canadian Space Agency astronaut Marc Garneau, Ph.D., and Andrew S.W. Thomas, Ph.D.

STS-77, scheduled for launch in the spring of 1996, will carry the Spacehab module, which nearly triples the amount of middeck locker space available for experiments. The Shuttle-Pointed Autonomous Research Tool for Astronomy (SPARTAN) satellite will be deployed and retrieved during the mission.

Casper, 51, has flown three previous Shuttle missions -- STS-36 in February 1990 aboard Atlantis, STS-54 in January 1993 on Endeavour, and STS-62 in March 1994 on Columbia. He received a master of science degree in astronautics from Purdue University in 1967. Casper considers Gainesville, GA, his hometown.

Brown, 39, flew on STS-47 aboard Endeavour in September 1992 and STS-66 in November 1994. He received a bachelor of science degree in electrical engineering from the Air Force Academy in 1978. Brown was born in Elizabethtown, NC.

-more-

Bursch, 37, will be making his third flight on the Shuttle. His two previous missions were STS-51 on Discovery in September 1993 and STS-68 on Endeavour in September 1994. Bursch considers Vestal, NY, his hometown.

Runco, 43, flew on Atlantis' STS-44 mission in November 1991 and Endeavour's STS-54 mission with Casper in January 1993. He received a master of science degree in meteorology from Rutgers University in 1976. Runco considers Yonkers, NY, his hometown.

Garneau, 46, flew as a Canadian astronaut on STS 41-G in October 1984. He was selected for Mission Specialist training in 1992. Garneau, born in Quebec City, Canada, earned a doctorate in electrical engineering from the Imperial College of Science and Technology, London, England, in 1973.

Thomas, 43, will be making his first flight aboard the Shuttle. He is a member of the astronaut class of 1992. Thomas was born in Adelaide, South Australia, and received his doctorate in mechanical engineering from the University of Adelaide in 1978.

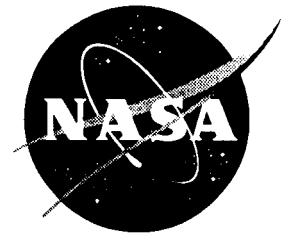
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NewsRelease

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



Don Nolan-Proxmire
Headquarters, Washington, DC
(Phone: 202/358-1983)

For Release

June 13, 1995

RELEASE: 95-91

NASA JOINS FAA AND DOD IN HUMAN FACTORS RESEARCH

NASA has joined with the Federal Aviation Administration (FAA) and the Department of Defense (DoD) in a comprehensive initiative to apply human factors research to the National Airspace System. The plan represents an all encompassing national commitment to making the system safer and less complicated for the people who use it.

"NASA is proud to work with the FAA and the Department of Defense in an effort to improve safety in commercial aviation," said NASA Administrator Daniel S. Goldin. "Since 1976, NASA has managed the Aviation Safety Reporting System for the FAA. Aviation incidents reported voluntarily and confidentially by pilots, air traffic controllers and others are combined to form the world's most comprehensive aviation human factors database," he added.

The action plan titled, "The National Plan for Civil Aviation Human Factors", is compatible with Vice President Albert Gore's National Science and Technology Council. The Council outlines a coordinated national agenda to address one of the principle goals established at the Department of Transportation's industry-wide Safety Conference last January: to eliminate accidents and incidents attributed to human error.

In spite of the success of more sophisticated and reliable technology, the proportion of human error-related accidents is still as high as 60 to 80 percent.

The initiative will bring research results to the operational community. Additionally the plan has three main goals: identifying operational needs and problems involving human performance; guiding research programs which address the human factor; and eliciting the participation of the nation's top scientists and aviation professionals in government, private industry and universities.

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The plan provides for sharing of research results among the participating government agencies and the private sector to increase the speed and efficiency by which new concepts in human performance can be tested, validated and incorporated into the national aviation system.

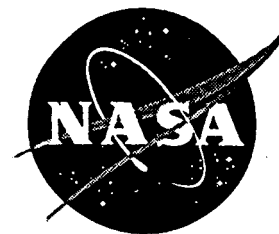
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News Release

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For Release

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June 13, 1995

RELEASE: 95-92

NASA ADMINISTRATOR RELEASES STATEMENT ON GAO REPORT

"The GAO's annual audit of the international Space Station program proves, once again, that the international Space Station program is on schedule and under budget," NASA Administrator Daniel S. Goldin said today. "The GAO has validated our cost estimates for the design, development, on-orbit assembly and operations of the international Space Station."

GAO reports that the estimate to design and build the international Space Station has remained constant at \$17.4 billion, and the estimate for ten years of operations is still \$13.0 billion.

While the GAO and NASA agree on these figures, the GAO makes other assertions with which NASA does not concur. For example, the report implies that the Space Shuttle program will have difficulty meeting the Space Station assembly schedule.

"I have full confidence that the Shuttle program can meet the Space Station's launch requirements on time and within budget," Goldin responded. "The Space Station is not a paper program anymore. We are building it. We have completed over 48,000 pounds of hardware to date."

GAO's Space Station life cycle cost estimate of \$93.9 billion includes \$50.5 billion for Shuttle transportation costs. NASA would still require funding for the Space Shuttle if the Space Station were canceled. Furthermore, over fifty percent of the funding for research conducted under the Life and Microgravity Sciences and Applications program is included in the Station budget. Prior costs for other Station designs and civil service salaries also are included in the GAO estimate.

- more -

"In this time of austere budgets, we must be very careful how we characterize NASA's funding," Goldin said. "These figures are not new. They are based on the average cost of a Shuttle flight. However, to suggest that these funds would be saved if Station were terminated is incorrect. NASA is firmly committed to human exploration of space, and we would still fly the Space Shuttle if the Space Station program were canceled."

The GAO Report did mention that the Space Station program is under budget and on schedule. Goldin stressed that "the program has made a year of solid progress since their last report." Some of the program's accomplishments over the past year include:

- Completing every major milestone on time
- Signing the Boeing prime contract for \$5.63 billion, about \$600 million less than originally estimated
- Building over 48,000 pounds of hardware to date, with over 75,000 to be completed by the end of 1995
- Signing the FGB protocol and successfully completing the FGB Critical Design Review
- Flying a successful rendezvous between the Space Shuttle and the Mir Space Station
- Launching Norm Thagard on his historic stay aboard Mir.

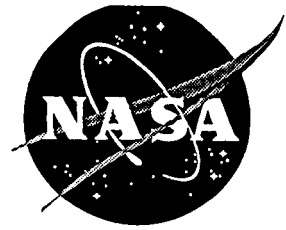
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Video Advisory

National Aeronautics and
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For Release

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)
VIDEO ADVISORY: V95-86

June 14, 1995

SHUTTLE-MIR DOCKING MISSION PREVIEWS ON NTV THURSDAY

Previews of the historic STS-71 Space Shuttle mission, during which Atlantis will dock with the Russian Mir space station, will be aired on the NASA TV news file starting Thursday. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

- ITEM #1: Interview with Atlantis Commander Robert "Hoot" Gibson** **TRT: 4:57**
Commander Gibson, a veteran of several Shuttle flights and an accomplished Navy pilot, will fly Atlantis during the docking sequence with the Russian Mir space station.
- ITEM #2: Interview with Dr. Bonnie Dunbar** **TRT: 8:35**
Dunbar has been training in Russia over the past year, and will be payload commander for the mission.
- ITEM #3: Interview with Flight Engineer Greg Harbaugh** **TRT: 6:29**
Harbaugh, a veteran astronaut with 343 hours in space, is assigned as the flight engineer for the STS-71 mission.
- ITEM #4: Interview with Dr. Ellen Baker** **TRT: 6:12**
Baker, a medical doctor, will be a mission specialist aboard Atlantis conducting life sciences experiments in the Spacelab module.
- ITEM #5: Interview with Charlie Precourt** **TRT: 6:05**
Precourt will pilot Atlantis into orbit during the mission. Precourt has flown over 45 different types of aircraft as well as the Space Shuttle.
- ITEM #6: Interview with Colonel Anatoly Solovyev** **TRT: 8:57**
Solovyev, Commander of the Mir 19 crew, has spent 377 days in space and has spent over 28 hours conducting space walks. Solovyev will join the Mir crew after docking.
- ITEM #7: Interview with Nikolai Budarin** **TRT: 5:00**
Cosmonaut Budarin will be flying into space for the first time aboard Atlantis. After docking he will join the Mir crew.
- ITEM #8: REPLAY - Kuiper Belt animation** **TRT: 2:00**
- ITEM #9: REPLAY - Comets from the Kuiper Belt** **TRT: :30**
- ITEM #10: REPLAY - Comets impacting Jupiter** **TRT: :25**
- ITEM #11: REPLAY - Interview with Anita Cochran** **TRT: 3:00**
- ITEM #12: REPLAY - Interview with astronomer Eugene Shoemaker** **TRT: 1:00**
- ITEM #13: REPLAY - Mars Pathfinder animation** **TRT: 1:30**
- ITEM #14: REPLAY - Mars Pathfinder Testing** **TRT: 2:30**
- ITEM #15: REPLAY - Interview with Brian Muirhead** **TRT: 3:30**
- ITEM #16: REPLAY - Interview with Rob Manning** **TRT: 2:00**
- ITEM #17: REPLAY - Interview with Dr. Les Compton** **TRT: 1:15**
- ITEM #18: REPLAY - Interview with Tom Rivellini** **TRT: 2:25**

NOTE: A live mission status briefing featuring American astronaut Norm Thagard from the Mir space station is scheduled to take place Thursday from 11:20-11:35 a.m. EDT. The status report will be replayed as the final item during the 3, 6, and 9 p.m. EDT news file feeds.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

News Release



National Aeronautics and
Space Administration

Washington, DC 20546
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For Release

Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

June 14, 1995

Lee Tune
National Research Council, Washington, DC
(Phone: 202/334-2138)

RELEASE: 95-93

NEW ORBITAL DEBRIS STUDY RELEASED

A new report on orbital debris has determined that the hazard to spacecraft posed by artificial debris, though still low, is growing and requires international action. The report also concluded that the problem needs to be addressed while it is still manageable and that the nations of the world should approach the problem with a cooperative, multi-pronged effort.

The report was funded by NASA and conducted by a committee of the National Research Council (NRC). This study is part of an ongoing interagency review of orbital debris programs and policies presently being carried out under the direction of the Office of Science and Technology Policy.

The NRC's report suggests several steps in approaching the orbital debris problem. First, spacefaring nations should work together to fill in critical gaps in the data on the effects of collisions between orbiting objects and on the amount and sources of debris in orbit to better estimate the current and future hazard to spacecraft.

Other steps include spacecraft designers being made more aware of ways to protect spacecraft against debris - for example, by shielding critical components of the spacecraft. At the same time, designers should develop and implement ways to prevent future spacecraft from adding to the problem.

Assessing the danger of orbital debris accurately is difficult because of the inherent problem of studying small, dark objects that are traveling at very high speed, hundreds or thousands of miles above the Earth. In low-Earth orbit only objects larger than 4 inches (10 centimeters) across can be tracked by ground-based sensors. In geostationary orbit, only objects larger than three feet (one meter) across can be tracked and cataloged.

- more -

Objects much smaller than those presently cataloged can destroy a spacecraft in a collision. Even collisions that do not destroy a spacecraft can degrade its performance or cause it to fail.

According to the NRC report, removal of existing debris from orbit is technically and economically infeasible, so international efforts should focus on preventive measures to reduce the future hazard. One step would be for leftover fuel or other energy sources to be dissipated from spacecraft and rockets at the end of their functional lives to ensure they do not explode. Other steps would include minimizing the release of debris during launch and on-orbit operation along with maneuvering rockets or spacecraft at the end of their functional lifetime either out of the low-Earth orbital region or into orbits that will carry them back into the Earth's atmosphere.

In their report the NRC committee suggested that an international group is needed to advise the space community about the most important questions regarding orbital debris and how best to answer these questions. Pending creation of this group, the committee proposed a set of interim research priorities that includes: carefully studying uncataloged objects in low-Earth orbit; gaining a better understanding of small debris by orbiting spacecraft that carry debris detection experiments; studying debris in geostationary orbits, through both measurements or modeling and improving models of debris sources and changes over time in the amount of debris.

NASA agrees with the concerns reflected in the NRC report and has taken the initiative to work with the major spacefaring nations to organize an international technical effort to develop a common understanding of the orbital debris environment and to develop techniques and practices to mitigate the orbital debris hazard.

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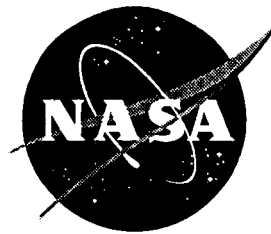
Editor's Note: A copy of the report, "Orbital Debris: A Technical Assessment" is available for review in the newsroom at NASA Headquarters, 300 E Street, S.W., Washington, DC. News media who wish to obtain a copy of the report should contact the NRC Office of News and Public Information at (202) 334-2138.

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NewsRelease

National Aeronautics and
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For Release

June 14, 1995

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Lori Rachul
Lewis Research Center, Cleveland, OH
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RELEASE: 95-94

MARS PATHFINDER PASSES MAJOR SET OF ENGINEERING MILESTONES

Mars Pathfinder, a NASA Discovery program mission designed to deliver a lander, camera and instrument-laden rover to the Martian surface on July 4, 1997, has successfully completed an initial set of engineering tests intended to validate the spacecraft's unique atmospheric entry, descent and landing techniques.

"Mars Pathfinder will employ a new and innovative approach to placing a lander on the surface of Mars, in keeping with NASA's 'faster, better and cheaper' philosophy of planetary exploration," said Tony Spear, Pathfinder project manager at NASA's Jet Propulsion Laboratory (JPL).

"This series of diverse tests has given us great confidence that the spacecraft will arrive safely and securely on Mars," Spear said. "A truly exciting scientific mission will then be ready to unfold."

The Viking 1 and 2 Mars landers of the mid-1970s used a complex, computer-controlled liquid retrorocket system to achieve a soft landing at about five miles per hour (eight kilometers per hour). In contrast, the smaller, tetrahedral-shaped Pathfinder lander will use a combination of parachutes, solid-fuel rockets and inflatable air bags to perform a safe, relatively hard landing at about 35 miles per hour (56 kilometers per hour).

-more-

Recent parachute drop stability tests were performed by Pioneer Aerospace of Windsor, CT, in the desert near Yuma, AZ. These tests successfully demonstrated the parachute configuration that will be used to bring the lander gracefully through the thin Martian atmosphere, said Ann Mauritz, JPL lead subsystem engineer.

Another element of the spacecraft's descent subsystems, the solid rocket motors, were tested at the China Lake Naval Weapons Center in Ridgecrest, CA. These tests involved dropping a simulated lander on a parachute from a helicopter and then firing three small prototype solid rockets to further slow the craft's fall toward the surface.

"The tests went just as predicted," said Dr. Les Compton, JPL lead subsystem engineer, with the simulated lander essentially coming to a dead stop in mid-air while at the same time maintaining a stable orientation with respect to the ground. Full-scale rocket prototypes, recently tested by Thiokol Corporation at Elkton, MD, will be used in full-scale subsystem tests to be carried out at China Lake later this summer.

Pathfinder's landing will be cushioned by four large air bags completely surrounding the lander's exterior petals. The air bag-based soft landing was recently demonstrated by the air bag designers, ILC Dover of Frederica, DE, inside the 120-foot (36.5-meter) vacuum chamber at the NASA Lewis Research Center's Plum Brook Station near Sandusky, OH. The vacuum chamber provides a way to simulate the very thin atmosphere of Mars, and the tests demonstrated the viability of the air bag design in softening the force of the impact on the lander and its delicate payload.

The air bag was dropped from a height of 70 feet (21 meters) onto a 40-foot (12-meter) platform containing many large rocks similar to those found on Mars, according to Tom Rivellini, JPL lead subsystem engineer. "The initial full-scale prototype drop tests were very successful," Rivellini said. "Engineers were able to test several air bag fabric construction techniques simultaneously. The tests showed that air bags constructed of a double-layered fabric will be necessary to provide a sufficiently rugged cushioning effect." A second phase of prototype drop testing later this year will demonstrate the durability of the new double-layered air bags, at even higher impact levels.

Like Viking, the Pathfinder lander will arrive at Mars packaged inside a space capsule-shaped entry vehicle. Hitting the thin upper atmosphere of Mars at more than 17,000 miles per hour (27,000 kilometers per hour), the entry vehicle's heat shield will slow the craft to 900 miles per hour (1,450 kilometers per hour) in about two minutes. An onboard computer will sense the slow-down in speed and then deploy a large parachute. The parachute can slow the lander down to about 155 miles per hour (250 kilometers per hour) in the rarified atmosphere of Mars, which is only 1/100th as dense as Earth's.

-more-

An onboard radar altimeter inside the lander will monitor the distance to the ground. At about 330 feet (100 meters) above the surface, the computer will inflate the air bags.

Seconds later, three solid rocket motors placed inside the top half of the entry vehicle above the lander will be fired. In approximately two seconds, the rockets will bring the lander to a stop some 40 feet (12 meters) above the Martian ground. The parachute will be released, and the lander, nestled inside its protective air bag cocoon, will fall to the ground, bouncing and rolling until it stops.

Within about an hour, the air bags will be deflated and partially retracted toward the lander. Pathfinder will then open its three metallic petals and stand itself right side up from any side that it happens to be lying on. The microrover, attached to the inside of one of the petals, will be exposed to the Martian terrain for the first time. After the lander camera has taken a photograph of its position on the Martian surface, engineers will instruct the rover to drive off and begin exploring the immediate surroundings, an ancient Martian flood plain known as Ares Vallis.

Scheduled for launch in December 1996, Mars Pathfinder is part of a new generation of low-cost spacecraft with highly focused science goals designed to explore planets and other celestial bodies of the solar system. Discovery missions are capped at \$150 million (FY92) each in development costs and must be readied for launch within 36 months.

Mars Pathfinder is managed by the Jet Propulsion Laboratory for NASA's Office of Space Science, Washington, DC.

-end-

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. Questions should be directed to (202) 358-4043.

EDITOR'S NOTE: Images to illustrate this release are available for news media representatives by calling the Headquarters Broadcast and Imaging Branch on 202/358-1900. Photo numbers are:

Images of air bag testing:	Color	B&W
	95-HC-323	95-H-332
	95-HC-324	95-H-333
	95-HC-325	95-H-334

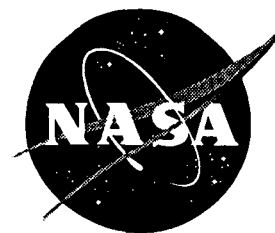
Artist Concepts of Mars Pathfinder:

93-HC-405	93-H-449
93-HC-406	93-H-450
93-HC-407	93-H-451

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

For Release
June 16, 1995

RELEASE: 95-95

NASA AND RSA SET JUNE 23 FOR LAUNCH OF STS-71 MISSION

Officials at NASA and the Russian Space Agency set June 23, 1995, as the launch date for the first docking mission between the U.S. Space Shuttle Atlantis and the Russian space station Mir.

This historic mission is the first of seven planned joint missions and comes almost twenty years after the two nations took the first steps towards joint cooperation with the Apollo-Soyuz linkup in July 1975. Atlantis' crew will consist of five Americans and two Russian cosmonauts.

The STS-71 launch is targeted for 5:08:37 p.m. EDT at the opening of a seven minute window. A launch on June 23 should allow docking with Mir to take place on flight day four of the mission at about 10:30 a.m. EDT. Atlantis will remain docked to Mir for almost five days during which the crews aboard both vehicles will conduct joint life sciences research experiments.

At the end of joint docked activities, the two Russian cosmonauts launched aboard Atlantis will assume responsibility for operations of the Mir station. The Mir-18 crew, who have been aboard Mir since March 16th, will join the STS-71 crew for the return trip to Earth. One of the Mir-18 crewmembers, American astronaut Norm Thagard, will return home with the American record for a single space flight with more than 100 days in space. The previous record was held by the Skylab-4 crew with 84 days in 1973-1974.

The STS-71 mission has a planned duration of approximately 10 days, 19 hours, 15 minutes if launch takes place on June 23, with landing scheduled to take place at the Kennedy Space Center's Shuttle Landing Facility on July 4 at approximately 12:30 p.m. EDT.

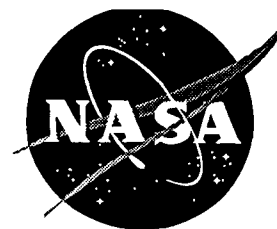
- end -

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 17, 1995

VIDEO ADVISORY: V95-88

ULYSSES SOLAR POLAR FLYBY FEATURED ON NASA TV MONDAY

A feature on the Ulysses spacecraft's exploration of the Sun will open Monday's NASA TV news file. NASA TV will replay a feature on imaging radar flown aboard the Space Shuttle that has helped researchers study the habitat of gorillas in Central Africa and air preview footage of NASA's next Shuttle mission. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Ulysses Crosses the Sun's North Pole

TRT: tbd

The Ulysses spacecraft has begun to explore the northern pole of the Sun, initiating the second phase of its primary mission to study regions above and below the star never before visited by a spacecraft. The spacecraft will spend 110 days gathering data on the complex forces at work over this high-latitude region of the Sun.

ITEM #2: REPLAY - NASA Technology Helps Study Gorilla Habitat

TRT: 2:15

ITEM #3: REPLAY - Virunga Volcano Chain

TRT: 1:15

ITEM #4: REPLAY - Mountain Gorillas

TRT: :30

ITEM #5: REPLAY - Interview with Dr. Diane Evans

TRT: 2:33

ITEM #6: The Blue Danube

TRT: 3:00

Footage from the STS-63 Shuttle/Mir rendezvous choreographed to Strauss' "Blue Danube."

ITEM #7: Mir space station animation

TRT: 3:19

Animated tour of the Russian space station.

ITEM #8: International Space Station animation

TRT: 1:33

Animation of the proposed international Space Station.

ITEM #9: Apollo-Soyuz docking in 1975

TRT: 8:58

Historic footage of Apollo-Soyuz docking and crew activities.

ITEM #10: IMAX footage of Mir shot during Mir Rendezvous

TRT: 2:08

Footage of the Mir from an earlier Shuttle/Mir rendezvous mission.

ITEM #11: Interview with General Tom Stafford

TRT: 4:00

General Stafford discusses the similarities and the differences between the upcoming Shuttle-Mir docking mission and the Apollo/Soyuz mission he was part of in 1975.

ITEM #12: Expanded Interview with Dr. Ellen Baker, M.D.

TRT: 30:00

Baker will be conducting life sciences experiments aboard STS-71.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

June 19, 1995

Lisa Malone
Kennedy Space Center, FL
(Phone: 407/867-2468)

NOTE TO EDITORS: N95-41

STS-71 COUNTDOWN BRIEFINGS/LAUNCH COVERAGE, JUNE 20-23

A series of briefings will be held this week at NASA's Kennedy Space Center in connection with the upcoming launch of Space Shuttle Atlantis and the first docking mission to the Russian space station Mir. The mission, designated STS-71, is scheduled for launch next Friday, June 23 at 5:08 p.m. EDT.

Beginning tomorrow, daily countdown status briefings will be held to update news media on final processing activities for the launch. A pre-launch news conference with NASA senior managers, who will discuss STS-71 mission readiness and objectives, will be held on June 22. Also on June 22, NASA TV will replay the STS-71 pre-flight briefings that were held at Johnson Space Center, Houston, on June 1-2, 1995.

News media should take note that the daily news video feeds will continue at their regularly scheduled release time of 12 noon EDT. Video advisories on the content of each day's feed will be issued in the normal manner.

Attached is a listing of the times, subjects and participants for each of the scheduled briefings. Also noted on the schedule are key STS-71 pre-launch activities and NASA TV replays.

- end -

STS-71 PAO BRIEFINGS & EVENTS

(Based on June 23, 1995 launch)

All times listed are EDT

LAUNCH - 3 DAYS - Tuesday, June 20

9:00 a.m. Countdown Status

Moderator: KSC PIO

Briefers: Bill Dowdell, Shuttle Test Director
Scott Higginbotham, KSC STS-71 Payload Manager

9:30 a.m. Begin STS-71 launch countdown

4:30 p.m. STS-71 Crew Arrival at KSC Shuttle Landing Facility

LAUNCH - 2 DAYS - Wednesday, June 21, 1995

9:00 a.m. Countdown Status

Moderator: KSC PIO

Briefers: John Guidi, NASA Test Director
Scott Higginbotham, KSC STS-71 Payload Manager
Ed Priselac, Shuttle Weather Officer

LAUNCH - 1 DAY - Thursday, June 22

10:00 a.m. Pre-Launch Press Conference*

Moderator: Lisa Malone

Briefers: Mr., Tommy W. Holloway, Director, Phase I Program, NASA-JSC
Mr. Valeriy Ryumin, Vice-President, Phase I, RSC Energia
Arnauld E. Nicogossian, M.D., Deputy Assoc. Admin., Office of Life
and Microgravity Sciences & Applications, NASA HQ
Brewster Shaw, Space Shuttle Program Director, JSC
Bob Sleck, Director, Shuttle Management & Operations, KSC
Capt. David Biggar, KSC Staff Weather Liaison

11:00 a.m. Replay of STS-71 Pre-Flight Briefings (held 6/1-2/95)

LAUNCH DAY - Friday, June 23, 1995

11:30 a.m. Begin STS-71 Launch Countdown Television Coverage

5:08 p.m. Launch of Space Shuttle Atlantis

6:15 p.m. Post-Launch Press Conference

Moderator: Lisa Malone

Briefers: Loren Shriver, Mgr., Launch Integration, Space Shuttle Prog., KSC
James Harrington, KSC Launch Director

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

June 19, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-89

CAMERA ON A COMPUTER CHIP ON NTV TUESDAY

New technology being developed by NASA that allows for a "camera on a chip" will be featured on Wednesday's news file. NASA TV will also air preview footage in preparation for Friday's launch of the Space Shuttle Atlantis on a historic Shuttle-Mir docking mission. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: New Imaging Sensor Shrinks Camera to the Size of a Chip **TRT: 1:30**

A new imaging sensor - a "camera on a chip" - is in development for NASA and is under consideration by several major companies for licensing. It may be used in the future for high definition television, electronic still cameras, and personal computer visual communications systems.

ITEM #2: Interview with Dr. Sabrina Kemeny **TRT: 1:05**

Dr. Kemeny, of NASA's Jet Propulsion Laboratory's Concurrent Processing Devices Group, discusses the advantages of the Advanced Pixel Sensor as compared with current imaging technology.

ITEM #3: Interview with Bob Nixon, JPL Imaging Team Member **TRT: 1:25**

Nixon explains what an Advanced Pixel Sensor is and how it may be used in the future.

ITEM #4: Space Shuttle Atlantis docking with Mir animation **TRT: 2:39**

ITEM #5: Atlantis/Mir docking simulation exercise **TRT: 4:27**

ITEM #6: Interview with Tommy Holloway on the Docking Mission **TRT: 4:00**

ITEM #7: REPLAY - Mir space station animation **TRT: 3:19**

ITEM #8: REPLAY - IMAX footage of Mir shot during Mir Rendezvous **TRT: 2:08**

ITEM #9: Expanded interview with STS-71 flight engineer Greg Harbaugh **TRT: 30:00**

ITEM #10: REPLAY - Ulysses Crosses the Sun's North Pole **TRT: 6:50**

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Doug Isbell
Headquarters, Washington, DC
(Phone: 202/358-1547)

June 19, 1995

Diane Ainsworth
Jet Propulsion Laboratory, Pasadena, CA
(Phone: 818/354-5011)

RELEASE: 95-96

ULYSSES BEGINS EXPLORATION OF THE SUN'S NORTHERN POLE

The Ulysses spacecraft has begun to explore the northern pole of the Sun, initiating the second phase of its primary mission to study regions above and below the Sun never before explored by spacecraft.

Ulysses, a joint NASA-European Space Agency mission, climbed to 70 degrees north of the Sun's equator at 4 a.m. EDT today. The spacecraft will spend the next 110 days gathering data on the complex forces at work over this high-latitude region of the Sun, reaching a maximum northern latitude of 80.2 degrees on July 31.

The spacecraft then will begin to journey out to the orbit of Jupiter, returning in September 2000 to the vicinity of the Sun, again at high latitudes. At that time, during the peak of the Sun's 11-year solar cycle, scientists expect to find a dramatically changed global view of the Sun (the Sun is currently nearing its most inactive or "quiet" phase of that cycle, meaning that fewer sunspots -- massive storms on the Sun's surface -- form in a given period of time).

As the spacecraft begins its pass over the northern polar region of the Sun, scientists are reporting a variety of new discoveries from Ulysses' recently completed pass over the southern pole. These findings are allowing them to begin assembling a new, three-dimensional picture of the Sun. Among their latest results:

* Ulysses has verified global differences in the speed of the wind flowing out from the Sun at different latitudes. Most notably, solar winds at high southern latitudes traveled at roughly double the speed found in the equatorial zone. The solar winds flow at approximately two million miles per hour (800 kilometers per second) at high southern latitudes, while dropping in velocity to about one million miles per hour (400 kilometers) near the equator.

- more -

*As the spacecraft approached the equator, the solar wind continued to be very fast until around 20 degrees south latitude, at which time an abrupt transition to the low-speed, low-latitude solar wind was seen. Large variations in the solar wind speed and other properties then continued until the spacecraft reached 20 degrees north latitude, at which time only the fast solar wind was again observed continuously.

* The loss of material from the Sun over the south pole, caused by the flow of the solar wind, is roughly one million tons per second. This matter consists of hydrogen, helium and a small fraction of metals and heavy atoms. Results of the southern pass also revealed the outward pressure of the solar wind to be much greater over the pole than it is around the equator. As a consequence, the shape of the heliosphere -- that region of space dominated by solar particles and electromagnetic fields -- may be elongated in the polar direction, extending much farther out into interstellar space than it does near the equator.

* High energy cosmic radiation entering the inner solar system and, eventually, Earth's atmosphere, from the galaxy is controlled at all latitudes by the level of solar activity, which is determined by each phase of the Sun's 11-year sunspot cycle. The findings suggest the Sun's control over how much cosmic radiation enters the solar system is just as effective in the polar regions as it is near the equator.

* Plasma waves -- electrical and magnetic fields that result from unstable distributions in the particles making up the solar wind -- play a role in regulating the behavior of solar wind particles and were expected to be found at nearly identical levels in both hemispheres of the Sun. However, as Ulysses crossed the Sun's equator and entered the northern hemisphere, observations revealed significantly higher levels of several varieties of plasma waves in the northern region of the Sun, compared to their presence in the southern hemisphere. The cause of this asymmetry is not yet understood, but plasma wave measurements will continue to be used as a diagnostic tool for studying the local properties of the solar wind along the spacecraft's trajectory.

Coordinated observations are under way using Ulysses and a recently launched NASA spacecraft called Wind, designed to study the solar wind flowing between the Sun and Earth. In addition, these two Sun probes are successfully tracking electrons which stream away from the Sun after the eruption of solar flares in the Sun's outer atmosphere.

These measurements will allow scientists to map for the first time the magnetic field lines along which electrons travel and provide new insights and observations into large-scale magnetic field structures occurring in the solar wind.

Ulysses also will conduct coordinated observations with NASA's Spartan spacecraft when it is launched later this summer aboard the Space Shuttle. The

aim of these coordinated observations will be to study the distribution of matter in the Sun's outer atmosphere and help engineers design science software for the scientific payload of a future European-built solar probe, known as the Solar and Heliospheric Observatory.

The Ulysses mission is managed jointly by the European Space Agency and NASA to study the regions over the Sun's poles. The Jet Propulsion Laboratory oversees the U.S. portion of the mission for NASA's Office of Space Science, Washington, DC.

- end -

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Michael Braukus
Headquarters, Washington, DC
(Phone: 202/358-1979)

June 19, 1995

Eileen Hawley
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-97

NASA LIFE SCIENCES RESEARCH GOES ON LINE

Beginning today on the Internet, computer users will be able to access the first stage of a NASA data archive that eventually will provide the wealth of scientific knowledge developed from 30 years of space-based research into the effects of microgravity on living systems, including the human body.

The Life Sciences Data Archive (LSDA) contains overview information on the 18 experiments conducted on the Spacelab Life Sciences-1 mission that flew on board the Shuttle in June 1991. As the system grows and matures, information from other life sciences research conducted on other missions, such as the International Microgravity Laboratory flights, Spacelab-Japan and Spacelab Life Sciences-2, will be included.

"We have a great deal of valuable information in our life sciences archive," said Gerry Taylor, Project Manager of the Life Sciences Data Archive and staff scientist in the Life Sciences Program Integration Office at the Johnson Space Center (JSC), Houston. "Now, people will be able to learn about the research we have done and how it has direct applications to their own quality of life here on Earth."

The information is housed at the National Space Science Data Center (NSSDC) with active links to a number of other NASA-related home pages. Internet users can access the information at:

http://nssdc.gsfc.nasa.gov/life/nssdc/life_home.html

-more-

The archives are designed for easy use by researchers, educators and students. The Master Catalog will serve as a top-level directory describing each completed life science space flight, and provide an overview of each experiment conducted during the flight. Beginning in the Fall of 1995, users also will be able to order several CD-ROM products from the NSSDC for more detailed information about a single mission or single experiment. The Mission CD-ROMs will provide information about the mission itself; the available LSDA Experiment CD-ROM will contain fundamental, analyzed and summarized data for any particular life sciences experiment conducted on a flight.

"We are very excited about the prospect of sharing this wealth of knowledge with the American public," Taylor said. "With the archives available through the Internet, researchers will be able to stay current with space life science research and results, and will benefit from having a central location where they can find this information."

Taylor also stressed that the information available on the Internet will be valuable to students and educators in preparing research papers or class lessons, and in proposing student experiments to NASA.

The Life Sciences Data Archive was developed jointly by the Office of Life and Microgravity Sciences and Applications at NASA Headquarters; JSC; Ames Research Center, Mountain View, CA; and Goddard Space Flight Center, Greenbelt, MD; with support from Martin Marietta Services Group, Houston, TX; Futron Corp. and the Uniformed Services University of Health Sciences, Bethesda, MD; Lockheed Engineering and Science Group, Houston, TX and Sunnyvale, CA; Hughes STX, Greenbelt, MD; Mains Associates, Berkeley, CA; and Universities Space Research Association, Washington, DC.

- end -

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Internet Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Allen Clark
Headquarters, Washington, DC
(Phone: 202/358-1826)

June 20, 1995

Kelly Humphries
Johnson Space Center, Houston, TX
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Lisa Malone
Kennedy Space Center, FL
(Phone: 407/867-2468)

INTERNET ADVISORY: I95-8

SHUTTLE MISSION HOME PAGE GOES ONLINE WEDNESDAY

With the countdown underway for this week's planned launch of the Shuttle Atlantis, NASA is unveiling a permanent home on the Internet for Shuttle mission information.

"On Board STS-71," focusing on the Atlantis-Mir docking flight, will be the maiden voyage of the official NASA source for World Wide Web information about all Space Shuttle missions.

The page also will feature five spectacular new images of Russia's Mir Space Station, available to the media from NASA Headquarters and to computer users via the Internet on Wednesday, June 21. The pictures are being released to help illustrate the upcoming docking of the Space Shuttle Atlantis to the Mir space station. The high resolution images show Mir over the Pacific ocean and were recorded using the IMAX Cargo Bay Camera during the STS-63 rendezvous mission on February 6, 1995.

The IMAX images and other information on STS-71 can be accessed at the following URL:

<http://shuttle.nasa.gov>

The Shuttle mission home pages are designed to give visitors the opportunity to experience a Space Shuttle mission through access to detailed, up-to-

-more-

the-minute multimedia information during each flight. The first effort to provide this kind of information to the public drew interest from tens of thousands of computer users all over the world during the STS-67/Astro-2 mission earlier this year.

For this and subsequent missions, the NASA Shuttle home page will provide real-time data that originates with the actual stream of telemetry between the Atlantis and Mission Control, Houston.

News media interested in the IMAX images can request them in color transparency or black and white print formats at (202) 358-1900. Photo numbers for the images are:

Mir over Pacific - #1	(95-HC-318, color trans; 95-H-327, bw print)
Mir over Pacific - #2	(95-HC-316, color trans; 95-H-325, bw print)
Mir over Pacific - #3	(95-HC-315, color trans; 95-H-324, bw print)
Mir @ 165 feet	(95-HC-319, color trans; 95-H-328, bw print)
Mir @ 50 feet	(95-HC-321, color trans; 95-H-330, bw print)

-end-

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Video Advisory

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

June 20, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-90

PREVIEWS OF FRIDAY'S SPACE SHUTTLE LAUNCH ON NTV

Footage previewing Friday's upcoming flight of the Space Shuttle Atlantis on a historic Shuttle-Mir docking mission will be featured on Wednesday's news file. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: IMAX Camera Training for Atlantis Crew **TRT: 2:02**

STS-71 Commander Hoot Gibson and Mission Specialist Ellen Baker are instructed on how to use the IMAX camera to capture large format documentary film of key events during the docking of the Space Shuttle with the Mir space station.

ITEM #2: Russian Language Training **TRT: 2:56**

Russian language training classes for astronauts that will fly on Atlantis during STS-71.

ITEM #3: Survival Training **TRT: 3:00**

Atlantis crewmembers prepare for the Mir Phase One docking missions.

ITEM #4: REPLAY - Space Shuttle Atlantis docking with Mir animation **TRT: 2:39**

ITEM #5: REPLAY - Atlantis/Mir docking simulation exercise **TRT: 4:27**

ITEM #6: REPLAY - Imaging sensor shrinks camera to size of a chip **TRT: 1:30**

ITEM #7: REPLAY - Interview with Dr. Sabrina Kemeny **TRT: 1:05**

ITEM #8: REPLAY - Interview with Bob Nixon, JPL Imaging Team **TRT: 1:25**

ITEM #9: Expanded interview with Dr. Bonnie Dunbar **TRT: 30:00**

Dr. Dunbar has been training in Russia over the past year and will be performing various life sciences experiments during STS-71.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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Jim Cast
Headquarters, Washington, DC
(Phone: 202/358-1779)

For Release

June 20, 1995

Jim Doyle
Jet Propulsion Laboratory, Pasadena, CA
(Phone: 818/354-5011)

RELEASE: 95-98

NEW IMAGING SENSOR SHRINKS CAMERAS TO THE SIZE OF A CHIP

A new imaging sensor -- virtually a camera on a chip -- is in development for NASA's space program and under consideration by several major companies for licensing.

The technology makes possible an imaging system that is smaller and cheaper than current state-of-the-art electronic imaging systems but comparable in performance, according to Dr. Eric Fossum, who led the team to develop the Active Pixel Sensor at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

Fossum said the new technology is a considerable leap beyond the current state of the art electronic sensors -- charge-coupled devices or CCDs. "It is a second generation solid state imaging technology," he said.

JPL has signed a technology cooperation agreement with AT&T Bell Laboratories. Several other companies, both large and small, are seeking licensing agreements to commercialize the technology.

Charge-coupled devices were developed by the Bell Laboratories in the early 1970s and have been used mostly in video camcorders and spacecraft. The solid-state devices led to relatively low-cost, compact imaging systems compared to Vidicons and other tube technology. The charge-coupled devices also have advanced as the microelectronics industry has improved its quality and fabrication techniques.

Charge-coupled devices with a million pixels, or picture elements, are expensive to make, costing about \$1,000 per million pixels when made for low-volume applications. Active Pixel Sensors, by contrast, are made within mainstream microelectronics technology -- the way chips for many other applications are made -- which can potentially reduce the cost to under \$200 per million pixels, according to Fossum.

-more-

The technology used to develop the Active Pixel Sensor is called complementary metal-oxide semiconductor, or CMOS. That technology, according to Fossum, is backed by an enormous worldwide research and development workforce and large amounts of capital investment. CMOS is used for nearly all microprocessors and memory chips. The cost of manufacturing a CMOS image sensor is currently about three times less than that of a CCD image sensor.

The CMOS Active Pixel Sensor was developed at JPL's Center for Space Microelectronic Technology for space applications in which it has several advantages over CCDs, including a requirement for less power and less susceptibility to radiation damage in space.

Other applications, Fossum said, include personal computer visual communications, high-definition television, electronic still cameras, laboratory-based cameras, medical instruments, nuclear instruments, toys, automotive applications and space-based surveillance systems.

The use of complementary metal-oxide semiconductors for the new sensors presents an additional opportunity for reducing imaging costs, power and size and improving reliability. The Active Pixel Image Sensor can be a single-chip camera system. It can communicate directly with a microprocessor or computer and allows for reduced component count.

-end-

EDITOR'S NOTE: A black and white image is available to news media representatives by calling the Broadcast & Imaging Branch at 202/358-1900. The NASA photo number is: 95-H-340.

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Brian Dunbar
Headquarters, Washington, DC
(Phone: 202/358-1547)

For Release
June 20, 1995
10 a.m. EDT

RELEASE: 95-99

NASA RELEASES GOLDIN'S STATEMENT ON REDUCTIONS

The following statement from NASA Administrator Daniel S. Goldin on the proposed cuts to the Agency's Mission to Planet Earth program was released today through the President's Office of Science and Technology Policy.

Statement of NASA Administrator Daniel Goldin Regarding Effects of Proposed Five-Year, \$2.7 Billion Reduction

The House of Representatives has approved a FY96 budget resolution which assumes a massive reduction over the next five years to NASA's efforts to study the Earth - Mission to Planet Earth. Such a cut would dismantle the national approach to U.S. global change research priorities established over the last three Administrations and undercut U.S. leadership in this important area of research. It would destroy this program's basic feature -- comprehensiveness -- and turn an integrated, global program into a series of disconnected and fundamentally less effective measurements. Worse still, it would condemn American scientists to pursuing an approach to environmental research that is more than a decade out of date.

The cuts would cripple the core of the program - the Earth Observing System (EOS) - the first integrated satellite and research system designed to observe the linkages among all the components of the Earth system--the land, oceans, atmosphere, ice sheets, and ecosystems. Understanding these linkages is the critical next step to unlocking the secrets of how the environment works and how it affects us all.

NASA's approach to EOS converges both scientific and practical interests. First, the same instruments will collect data of significant value to both communities, as demonstrated by more than two successful decades of Landsat information. Second, scientists recognize that they must be able to translate their research down to the regional level to truly understand global climate effects. Practical users need regional information, as well as its global context. Most

- more -

importantly, the EOS data will be used to forecast the climate - a year in advance at first, then progressively longer. The ability to make reliable regional and global climate forecasts will have a profound impact on society. Such forecasts are key to major improvements in agricultural and urban planning, water and forest management, investment and capital decisions, and fishing, all of which fundamentally affect U.S. competitiveness. They would also enable improvements in our ability to predict and react to natural disasters, like floods and hurricanes, thereby preventing greater loss of life and property. All of these gains would be lost if the proposed cuts to EOS are sustained.

The U.S. government - in partnership with scientists, private companies, and other nations - must ensure that this cutting-edge research that is the foundation of Mission to Planet Earth is continued. Government leadership in this science and technology innovation is the key to enabling the broad commercial contributions, foreseen by many, in the environmental field and realizing numerous benefits for science, commerce, and policy. NASA has always been at the forefront of such advances in knowledge and we stand committed to this effort.

By walking away from the systematic and comprehensive approach for Mission to Planet Earth, the U.S. would also give up its undisputed world leadership in Earth observations, jeopardize technologies which will be critical to the growing commercial remote sensing market, and reduce our ability to influence the global environmental agenda. Significant U.S. investment in environmental science is the key to preserving this impartiality among nations and sustaining U.S. economic competitiveness in the global marketplace.

We at NASA are all committed to prudent and permanent deficit reduction. Recognizing our fiscal responsibility, NASA has already made enormous reductions in our future budgets. However, further cuts to Mission to Planet Earth - and environmental research in general - seriously jeopardize an investment in the future that will return economic and quality of life benefits far in excess of what we spend today.

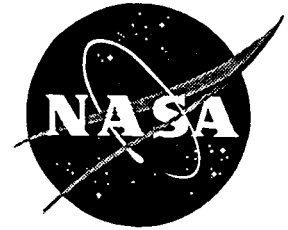
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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Terri Hudkins
Headquarters, Washington, DC
(Phone: 202/358-1977)

June 21, 1995

Greta Creech
Headquarters, Washington, DC
(Phone: 202/358-2343)

NOTE TO EDITORS: N95-42

SPACE SHUTTLE AND SPACE STATION MOCKUPS COME TO DC

Mockups of the Space Shuttle and the Space Station will land in Washington, DC, Thursday, June 22.

Space Shuttle Blake, a 4/10 scale mockup of the Space Shuttle Challenger, will be launched on its educational mission with a ceremony on Capitol Hill with Congressman Paul McHale (D-PA), NASA Administrator Daniel S. Goldin and astronaut G. David Low.

The event will take place at 8:30 a.m. EDT in Garfield Circle, 1st St. and Maryland Ave., SW, near the entrance to the U.S. Botanical Garden. After the ceremony, the Shuttle mockup will be on display until 2 p.m. for tours.

A life-size mockup of the interior of the Space Station laboratory and habitation modules -- where astronauts will conduct research and live in space -- will be on display for viewing at the corner of 4th Street and Independence Avenue, SW, just east of the National Air and Space Museum. The trailers will be open to the public on June 22 from 10:30 a.m. - 7 p.m., June 23 from 1 p.m. - 7 p.m., and June 24 from 10:30 a.m. - 7 p.m.

The Station exhibit will offer visitors a view of life in space. Staff will be available to answer questions and explain how the international Space Station will be used.

Shuttle Blake began as a former Marine Corps bus that was transformed into a \$3.1 million mobile classroom by art teacher Robert Boehmer and former principal Stephen Szilagyi of Schnecksville Elementary School, Schnecksville, PA.

The inspiration for Blake grew out of NASA's 1989 education program that offered American students the opportunity to name the replacement Orbiter in recognition of both their remembrance of the Challenger and their enthusiasm for space exploration.

-more-

-2-

Szilagyi and Boehmer -- whose student team was a Pennsylvania state finalist in NASA's orbiter-naming competition -- wanted Blake to continue the Challenger mission. They chose the name "Blake" in honor of America's first oceanographer, Alexander Agassiz, who expanded the research conducted on the renowned British oceanographic vessel Challenger.

Blake was designed to simulate space travel and allow students to use education technology out of the traditional classroom. The simulations of a launch and various aspects of a Shuttle mission provide real-time problem-solving and applied learning for students.

The 45-foot, road-ready educational Shuttle laboratory is equipped with a microcomputer network featuring interactive hypermedia, laser disc technology, optical data laser discs, computers, a flight simulator and software to amplify lessons in physics, English, math and geography. Other equipment includes a miniature robotic arm, weather systems, cellular communications, and ham-radio equipment for real-time contact with the Space Shuttle and Russian Mir space station.

-end-

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Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 21, 1995

VIDEO ADVISORY: V95-91

WALLOPS ANNIVERSARY, UPCOMING SHUTTLE FLIGHT PREVIEWED

A student Space Shuttle mock-up exhibit visiting Washington and video previewing the 50th Anniversary of the Wallops Flight Facility will be shown on NASA TV Thursday. Also, footage in preparation for Friday's planned launch of the Space Shuttle Atlantis will be replayed. *The transmission times for the video news file are noon, 3 p.m., 6 p.m. and 9 p.m. EDT.*

ITEM #1: Student Space Shuttle mock-up visits Washington **TRT: tbd**
Students from Schnecksville Elementary School, Schnecksville, PA, visit Washington with a mock-up of a Space Shuttle made from a converted bus.

ITEM #2: Wallops Sounding Rockets **TRT: 1:30**
NASA's Wallops Flight Facility, celebrating its 50th Anniversary on June 24, manages NASA's sounding rocket program.

ITEM #3: Wallops Scientific Balloons **TRT: 1:30**
NASA's scientific balloon program, managed by Wallops, uses thin film, helium-filled balloons for scientific research missions each year.

ITEM #4: REPLAY - Mir space station animation	TRT: 3:19
ITEM #5: REPLAY - Space Shuttle Atlantis docking with Mir animation	TRT: 2:39
ITEM #6: REPLAY - Atlantis/Mir docking simulation exercise	TRT: 4:27
ITEM #7: REPLAY - IMAX camera training for Atlantis Crew	TRT: 2:02
ITEM #8: REPLAY - IMAX Footage of Mir during rendezvous mission	TRT: 2:08
ITEM #9: REPLAY - Ride of your life	TRT: 4:38
ITEM #10: REPLAY - Expanded interview with Hoot Gibson	TRT: 30:00

NOTE: NASA TV will air a pre-launch press conference from the Kennedy Space Center, FL, on Thursday at approximately 10 a.m. EDT.

A World Wide Web Space Shuttle home page is now in operation. Information about STS-71 is available via the Internet at URL:

<http://shuttle.nasa.gov>

Media and the public are encouraged to visit the mission home page for extensive background material and real-time information about the Shuttle-Mir docking mission.

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release



National Aeronautics and
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Washington, DC 20546
(202) 358-1600

For Release

Douglas Isbell
Headquarters, Washington, DC
(Phone: 202/358-1753)

June 21, 1995

Diane Ainsworth
Jet Propulsion Laboratory, Pasadena, CA
(Phone: 818/354-5011)

RELEASE: 95-100

NASA SELECTS NEW MILLENNIUM PROGRAM PARTNERS

Twenty-three industry and university partners across the country, representing all sectors of the U.S. technological community, have been selected to team with NASA in the New Millennium Program. This bold new technology effort aims to develop and demonstrate breakthrough technologies for low-cost space science missions of the 21st century.

The 23 organizations will participate in four of the five Integrated Product Development Teams in the New Millennium Program, following a two-month process that reviewed more than 230 proposals originally submitted to NASA.

"These teams will lead in the development and delivery of selected advanced technologies in four primary spaceflight development areas: autonomy, communications, microelectronics and modular architectures and multifunctional systems," said Kane Casani, manager of the program at NASA's Jet Propulsion Laboratory, Pasadena, CA.

"With this dynamic, synergistic partnership, we are striving to introduce revolutionary technologies, spacecraft designs and operations concepts," Casani said, "to bring about a transformation in the way we explore the solar system and study Earth from space in the next century."

Selection of industry, academic and nonprofit research organization members for the fifth Integrated Product Development Team -- focusing on science instruments and micro, electro and mechanical systems -- will be announced in late July.

The New Millennium Program is focused on development and validation in space of advanced technologies needed for a fleet of small spacecraft that will explore the solar system, monitor Earth and observe the cosmos. Constellations or networks of spacecraft, carrying instruments sometimes as small as a dime, will be designed to study phenomena occurring in Earth's atmosphere, oceans and land masses, as well as astronomical events in the solar system and beyond.

-more-

The Integrated Product Development Teams will play a multi-faceted role in the New Millennium Program. They will be involved in all aspects of the program, from technology development through science data processing. In identifying advanced technologies appropriate for demonstration on New Millennium flights, the teams will recommend technologies that should also sharpen the country's competitive edge in the commercial marketplace.

The proposals under review for inclusion in the New Millennium Program cover a wide range of imaginative technologies that will enable NASA to launch focused space and Earth science missions as often as once a month by early in the next century, Casani said. All were aimed at reducing total mission costs and improving the scientific benefits of Earth and space science missions now on the drawing boards at NASA.

The program is designed to validate these advanced technologies and operations techniques through a series of actual spaceflight missions. Among the most popular mission concepts now under consideration is a flight that includes a flyby of either a comet or asteroid. This flight would provide an opportunity to demonstrate a solar electric propulsion system, which is much smaller in mass compared to traditional chemical propulsion systems. Other mission concepts include Earth-observing networks and constellations, and a microlander that would be destined for Mars or other planets.

These missions would demonstrate prototypes of highly sophisticated instruments designed to achieve specific scientific goals. Another concept in review, for instance, is a free-flying interferometer, an optical science instrument that combines light from several telescopes flying in formation with each other into one unified image. The mission would demonstrate the technologies and operating techniques for subsequent missions that should be able to detect and characterize planets around other stars.

NASA plans to select three demonstration missions developed by the New Millennium Program teams and announce those mission selections by the end of the summer. The first experimental mission will fly in late 1997 or early 1998, with the remaining missions to follow at approximately one-year intervals through 2000.

The New Millennium Program is managed by the Jet Propulsion Laboratory for NASA's Offices of Space Science, Space Access and Technology and Office of Mission to Planet Earth, Washington, DC.

Note to Editors: A list of industry partners and academic institutions teaming with NASA in the New Millennium Program follows.

INTEGRATED PRODUCT DEVELOPMENT TEAM MEMBERS

COMMUNICATIONS:

Lockheed Martin Corporation, Valley Forge, PA
Boeing Co., Seattle, WA
Loral, Palo Alto, CA
University of Michigan at Ann Arbor
TRW, Redondo Beach, CA

AUTONOMY:

Lockheed Martin Corporation, Palo Alto, CA
TRW, Redondo Beach, CA
Carnegie Mellon University, Pittsburgh, PA
Hughes Danbury Optical Systems, Danbury, CT
OCA Applied Optics, Garden Grove, CA
Stanford University, Palo Alto, CA
Microcosom, Inc., Torrence, CA

MICROELECTRONICS:

Lockheed Martin Corporation, East Windsor, NJ
Loral, Palo Alto, CA
TRW, Redondo Beach, CA
Honeywell, Clearwater, FL
Space Computer Co., Santa Monica, CA
University of California at San Diego
Optivision, Palo Alto, CA
University of Southern California, Los Angeles

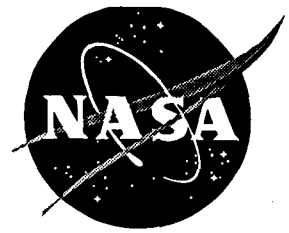
MODULAR ARCHITECTURES AND MULTIFUNCTIONAL SYSTEMS:

Lockheed Martin Corporation, Denver, CO
L'Garde, Inc., Tustin, CA
OLIN, Redman, WA

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 22, 1995

VIDEO ADVISORY: V95-92

LIVE COVERAGE OF SHUTTLE MISSION BEGINS ON NTV FRIDAY

NASA Television will begin live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission at 11 a.m. EDT Friday. **Launch of Atlantis is scheduled for 5:06 p.m. EDT.** Live coverage of the mission will continue through Shuttle landing, scheduled for 12:37 p.m. EDT July 4 at the Kennedy Space Center, FL.

During STS-71 Atlantis will dock with the Russian Mir space station as part of increased space cooperation between NASA and the Russian Space Agency. The flight will lay the foundation for constructing the international Space Station. The STS-71 mission also will mark America's 100th human space mission. Two Russian cosmonauts will fly into space aboard Atlantis and join the Mir, while American astronaut Norm Thagard and cosmonauts Vladimir Dezhurov and Gennady Strekalov will board Atlantis for their return to Earth. Thagard, having spent over three months aboard Mir, now holds the American record for the longest continuous time in space.

From approximately 6-7:15 and 8:15-9 a.m. EDT NASA TV will provide a live static feed of Atlantis on the launch pad at the Kennedy Space Center, FL.

During the STS-71 mission, media may obtain mission updates by contacting the following NASA Newsrooms:

Launch, Landing	Kennedy Space Center, FL	407/867-2468
During mission, including Mir docking	Johnson Space Center, Houston	713/483-5111

A World Wide Web Space Shuttle home page is now in operation on the Internet. Information about STS-71 is available at URL:

<http://shuttle.nasa.gov>

Media and the public are encouraged to visit the Shuttle home page for extensive background material and real-time information about the Shuttle-Mir docking mission. Included at the Shuttle home page is information on Shuttle-Mir sighting opportunities for major cities around the world during the STS-71 mission.

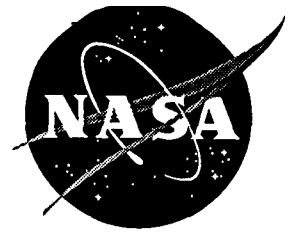
NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Video Advisory

National Aeronautics and
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(202) 358-1600



For Release

June 23, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

VIDEO ADVISORY: V95-93

LIVE COVERAGE OF SHUTTLE MISSION LAUNCH ON SATURDAY

NASA Television will provide live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission launch on Saturday. **Launch of Atlantis is scheduled for 4:43 p.m. EDT Saturday.** Live coverage of the mission will continue through Shuttle landing, scheduled for approximately noon EDT July 4 at the Kennedy Space Center, FL.

During STS-71 Atlantis will dock with the Russian Mir space station as part of increased space cooperation between NASA and the Russian Space Agency. The flight will lay the foundation for constructing the international Space Station. The STS-71 mission also will mark America's 100th human space mission. Two Russian cosmonauts will fly into space aboard Atlantis and join the Mir, while American astronaut Norm Thagard and cosmonauts Vladimir Dezhurov and Gennady Strekalov will board Atlantis for their return to Earth. Thagard, having spent over three months aboard Mir, now holds the American record for the longest continuous time in space.

During the STS-71 mission, media may obtain mission updates by contacting the following NASA Newsrooms:

Launch, Landing	Kennedy Space Center, FL	407/867-2468
During mission, including Mir docking	Johnson Space Center, Houston	713/483-5111

A World Wide Web Space Shuttle home page is now in operation on the Internet. Information about STS-71 is available at URL:

<http://shuttle.nasa.gov>

Media and the public are encouraged to visit the Shuttle home page for extensive background material and real-time information about the Shuttle-Mir docking mission. Included at the Shuttle home page is information on Shuttle-Mir sighting opportunities for major cities around the world during the STS-71 mission.

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News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

June 23, 1995

Jim Cast
Headquarters, Washington, DC
(Phone: 202/358-1779)

Brian Dunbar
Headquarters, Washington, DC
(Phone: 202/358-0873)

RELEASE: 95-101

NASA FORMS TASK TEAMS TO REVIEW SPACE ACCESS OPTIONS FOLLOWING LOSS OF PEGASUS LAUNCH VEHICLE

NASA is forming several task teams to address all aspects of its strategy for access to space following the latest failure of an Orbital Sciences Corp. Pegasus launch vehicle carrying a U.S. Air Force payload on June 22.

The task teams will review near term recovery for Pegasus-related missions already in the inventory, as well as long term issues associated with next generation launch vehicles. The review effort is being organized by Associate Deputy Administrator Michael I. Mott.

"NASA sees a serious shortage over the next few years of small launch vehicle support for its scientific missions," said Dr. John E. Mansfield, Associate Administrator for Space Access and Technology. "At the moment, there is a significant backlog of these important missions, a situation NASA cannot allow to continue. These missions must have assured launch support."

As part of this effort, NASA anticipates issuing a Request for Information (RFI) asking for expressions of interest from industry in providing alternate sources of small expendable and reusable launch vehicle services in both the near and long term. NASA is interested in innovative technical and business approaches to ensuring that launch support is available when needed to carry out its missions, Mansfield said.

To reach the broadest section of industry, including small businesses, NASA will announce its intent and the availability of this RFI in the Commerce Business Daily as soon as possible. After analyzing NASA's requirements and capabilities, as well as any expressions of interest received as a result of the RFI, Mott will make recommendations concerning near and long term launch strategies, to include improvements appropriate to ensure more robustness, redundancy and flexibility.

-end-

NewsRelease



National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

Ray Castillo
Headquarters, Washington, DC
(Phone: 202/358-4555)

For Release
June 26, 1995

Steve Roy
Marshall Space Flight Center, Huntsville, AL
(Phone: 205/544-6535)

NOTE TO EDITORS: N95-43

MARSHALL HOSTS INTERNATIONAL SPACE STATION TESTING THIS WEEK

Media representatives are invited to view this week underwater activities that simulate spacewalks and tests by teams developing flight hardware for the international Space Station. The tests will be conducted in the Neutral Buoyancy Simulator at NASA's Marshall Space Flight Center, Huntsville, AL.

The 1.5-million-gallon facility is used to simulate the microgravity environment of space, permitting the development and testing of hardware, tools and operational procedures used during actual spacewalks. Former Skylab astronaut Jerry Carr will conduct a simulated spacewalk at 11 a.m. EDT on Tuesday, June 27.

Other tests will involve activities inside a mock-up of the Space Station's U.S. Laboratory module and a node module in the Simulator. Underwater activities inside the modules will include evaluation of equipment assembly tasks, handling of experiment and equipment racks, use of aids to mobility, such as foot restraints and hand holds and maintenance procedures for a Thermal Control System. Testing inside the modules will simulate the "shirtsleeve" environment planned for daily operations aboard the Space Station.

Engineers and technicians designing and building the Space Station also will use the facility to evaluate and improve equipment and tools designed for development of actual Space Station flight hardware.

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News Release

National Aeronautics and
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Washington, DC 20546
(202) 358-1600



For Release

Laurie Boeder
Headquarters, Washington, DC
(Phone: 202/358-1898)

June 26, 1995

RELEASE: 95-102

SCHUMACHER, WHITEHEAD APPOINTED ASSOCIATE ADMINISTRATORS

NASA Administrator Daniel S. Goldin has appointed John D. Schumacher as the Associate Administrator for the Office of External Relations and Dr. Robert E. Whitehead as the Associate Administrator for NASA's Office of Aeronautics, NASA Headquarters, Washington, DC, effective immediately.

The Office of External Relations provides international policy formulation, coordination and implementation. The Office of Aeronautics is responsible for directing NASA's aeronautics research and development programs.

"Bob Whitehead and John Schumacher are talented managers with extensive experience in their fields," Goldin said. "Our aeronautics program and our work in developing partnerships with other nations are central elements of NASA's vision for the future, so we are indeed fortunate to have Bob and John heading up those key areas."

Schumacher came to NASA from the law firm of Rogers & Wells, New York, NY, in June 1989 and served as Advisor to the NASA Administrator until January 1991, when he became the Deputy Associate Administrator for External Relations. He was appointed Acting Associate Administrator for External Relations in September 1994.

Earlier in his career, Schumacher served as a Naval officer with tours of duty aboard the USS Guadalcanal, at the Organization of the Joint Chiefs of Staff, and as Aide to the Director, Navy Command and Control. He graduated with distinction from the United States Naval Academy, earning a B.S. in oceanography/general engineering in 1976. He earned an M.A. in government, with a certificate in national security studies, from Georgetown University in 1984. Schumacher earned a J.D. from the Columbia University School of Law, and a certificate with honors in international law from Columbia's Parker School of International and Foreign Law in 1987. He is a member of the New York Bar, the American Bar Association (International Law Section) and the U.S. Naval Institute.

-more-

Whitehead, who joined NASA in 1989, has been the Deputy Associate Administrator for Aeronautics, NASA Headquarters, Washington, DC, since February 1994. He played a key role in advising and working closely with the Associate Administrator in developing strategic plans and direction for NASA's aeronautics research programs and in institutional management of NASA's Ames, Dryden, Langley and Lewis Research Centers.

Whitehead began his career in 1970 as a postdoctoral research associate at NASA's Ames Research Center, Mountain View, CA. From 1971-1976, he was a research engineer at the Department of the Navy's David Taylor Research Center, Potomac, MD.

In 1976 he joined the Office of Naval Research as scientific officer for aerodynamics and later held positions as program manager for fluid dynamics (1981-1985) and Director, Mechanics Division (1985-1989).

Whitehead received B.S. (1967), M.S. (1969) and Ph.D. (1971) degrees in engineering mechanics from the Virginia Polytechnic Institute and State University. He is a member of the American Institute of Aeronautics and Astronautics and the American Helicopter Society.

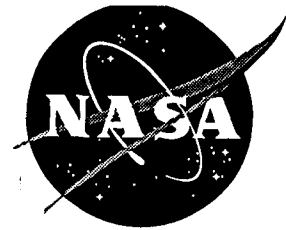
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Video Advisory

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(202) 358-1600



For Release

June 27, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)
VIDEO ADVISORY: V95-94

LIVE SPACE SHUTTLE MISSION COVERAGE CONTINUES ON NTV

NASA Television will continue to provide live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission Wednesday. Space Shuttle Atlantis launched from the Kennedy Space Center, FL, at -- 3:32 p.m. EDT Tuesday, June 27. Docking with the Mir space station is currently set for Thursday, June 29 at approximately 9 a.m. EDT, with a landing of the Orbiter at the Kennedy Space Center on Friday, July 7 at approximately 10:56 a.m. EDT.

WEDNESDAY MISSION HIGHLIGHTS (All times EDT)

4:32 a.m. **CREW WAKE UP**

8:37 a.m. **SPACELAB MODULE INGRESS**

The crew will enter the Spacelab module, where space life sciences experiments will be conducted

12 p.m. **MISSION UPDATE**

A live review of news and highlights of the first flight day, from the Johnson Space Center, Houston

2:30 p.m. **MISSION STATUS BRIEFING**

Live mission status briefing with NASA officials, from Houston

4, 8 p.m. **FLIGHT DAY VIDEO FILE**

Videotape replay of the day's mission highlights

7:32 p.m. **CREW SLEEP BEGINS**

During the STS-71 mission, media may obtain mission updates by contacting the following NASA Newsrooms:

During mission, including Mir docking
Shuttle landing operations

Johnson Space Center, Houston
Kennedy Space Center, FL

713/483-5111
407/867-2468

A World Wide Web Space Shuttle home page is available on the Internet. The URL is:

<http://shuttle.nasa.gov>

Media are encouraged to visit the Shuttle home page for extensive background material and real-time information about the Shuttle-Mir docking mission. Included at the Shuttle home page is information on Shuttle-Mir sighting opportunities for major cities around the world during the STS-71 mission.

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Video Advisory

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For Release

June 28, 1995

David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)
VIDEO ADVISORY: V95-95

LIVE SHUTTLE-MIR DOCKING ON NASA TV THURSDAY

NASA Television will continue to provide live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission Wednesday. Atlantis launched from the Kennedy Space Center, FL, at 3:32 p.m. EDT June 27. Docking with the Mir is scheduled for Thursday, June 29 at approximately 9 a.m. EDT, with a landing of the Orbiter at the Kennedy Space Center on Friday, July 7 at approximately 10:56 a.m. EDT.

THURSDAY MISSION HIGHLIGHTS

(All times EDT)

- 2:32 a.m. CREW WAKE UP**
- 2:47 a.m. MIR RENDEZVOUS OPERATIONS BEGIN**
- 8:40 a.m. 30 FOOT STATION KEEPING**
Orbiter is at 30 feet from Mir space station
- 8:45 a.m. BEGIN FINAL APPROACH TO MIR**

- 9:00 a.m. ATLANTIS-MIR DOCKING**
May not be televised, dependent upon Orbiter/Mir approach, attitude; time approximate
- 9:32 a.m. VIDEO TAPE REPLAY DUMP OF RENDEZVOUS DOCKING**
approximately 20 minutes of video replay
- 11:02 a.m. HATCH OPENING AND WELCOME**
The two crews greet one another

- 12:30 p.m. MISSION STATUS BRIEFING (time subject to change)**
Live mission status briefing with NASA officials, from Houston, TX
- 1:30 p.m. MISSION UPDATE**
Live review of the days mission highlights from the Johnson Space Center, Houston
- 3:32 p.m. VIDEO SURVEY OF MIR**
- 5:30 p.m. FLIGHT DAY VIDEO FILE**
A replay of the day's video highlights
- 6:32 p.m. CREW SLEEP BEGINS**

During the STS-71 mission, media may obtain mission updates by contacting the following NASA Newsrooms:

During mission, including Mir docking
Shuttle landing operations

Johnson Space Center, Houston
Kennedy Space Center, FL

713/483-5111
407/867-2468

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Ed Campion
Headquarters, Washington, DC
(Phone: 202/358-1778)

June 28, 1995

Kyle Herring
Johnson Space Center, Houston
(Phone: 713/483-5111)

RELEASE: 95-104

REIGHTLER, RICHARDS, THUOT LEAVE ASTRONAUT CORPS

Veteran Space Shuttle astronauts Kenneth S. Reightler, Jr., Richard N. (Dick) Richards and Pierre J. Thuot have left the Astronaut Office following a cumulative nine Shuttle flights.

Reightler, a Navy Captain, had been serving as the chief of the space station branch of the Astronaut Office. He will join Lockheed Martin, Houston, as the Program Manager for Engineering, Test and Analysis. He will manage work that includes robotics, Earth observations, engineering analysis, simulation and thermochemical test.

Reightler flew twice on the Shuttle: STS-48 in September 1991, deploying the Upper Atmosphere Research Satellite, and STS-60 in February 1994, which was the first flight of the Wake Shield Facility. Both missions were aboard Space Shuttle Discovery.

Richards, also a Navy Captain, remains at NASA, moving from the Astronaut Office to the Space Shuttle Program Office to serve as mission director for the second servicing mission of the Hubble Space Telescope. He also will serve as flight manager for next year's second flight of the Tethered Satellite System on STS-75 and the third flight of the Wake Shield Facility on STS-80.

He will work with external organizations in all matters relating to mission planning and execution of the Hubble servicing flight as well as coordinate project activities. He also will assist in maximizing the effectiveness of Shuttle flights within established technical, budgetary and schedule constraints.

-more-

Richards has flown on four Shuttle flights: STS-28 in August 1989 on Columbia, a Department of Defense mission; STS-41 in October 1990 on Discovery to deploy the Ulysses planetary spacecraft; Columbia's STS-50 flight in June/July 1992 to study microgravity sciences, and STS-64 in September 1994 on Discovery which carried a laser to study the Earth's environment.

After three Shuttle flights, Thuot has returned to the Naval Academy in Annapolis, MD, to be an instructor in the Aerospace Engineering Department. He will primarily teach undergraduate courses in astronautics.

His three Shuttle flights included: a Department of Defense mission in February 1990 on Atlantis (STS-36); the maiden flight of Endeavour on a satellite rescue mission in May 1992 (STS-49), and Columbia's March 1994 mission to obtain data from experiments in the microgravity environment in space (STS-62).

-end-

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



For Release

Brian Welch
Headquarters, Washington, DC
(Phone: 202/358-1600)

June 28, 1995

RELEASE: 95-105

CHRISTENSEN TO HEAD NEW HEADQUARTERS OPERATIONS OFFICE

As part of an effort to dramatically reduce staffing at its headquarters, NASA is merging a variety of staff functions within an Office of Operations to be headed by Michael D. "Chris" Christensen, effective immediately.

The new Headquarters Operations Office will consolidate institutional functions from seven organizations. Those functions, involving areas such as procurement and finance, relate to the daily running and operations of the NASA Headquarters installation.

"This consolidation is one more step in a process that will result in a 50% reduction in staffing at NASA Headquarters by Fiscal Year 1999," said Acting Deputy Administrator John R. Dailey. "The new Operations Office under Chris Christensen will allow us to achieve the maximum amount of efficiency in the daily running of our organization here in Washington."

Christensen began his NASA career as a Federal personnel intern in 1967. During his tenure at NASA, he has worked at the Kennedy Space Center, FL, Johnson Space Center, Houston, TX, and the Goddard Space Flight Center, Greenbelt, MD, as well as NASA Headquarters. In 1975, he became Deputy Chief of the Manpower Utilization Division at Goddard.

In 1979, Christensen joined the Agricultural Research Service, Department of Agriculture, as Director of Personnel. He subsequently served as Associate Deputy Administrator for Management.

In 1988, Christensen rejoined NASA in his current capacity as Deputy Associate Administrator for Management Systems and Facilities. He has been the recipient of the Secretary of Agriculture's Distinguished Service Award, NASA's Exceptional Service Award, and a Presidential Meritorious Rank Award. He and his wife, Jan, reside in Columbia, MD.

-end-

Video Advisory

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 29, 1995

VIDEO ADVISORY: V95-96

LIVE SHUTTLE-MIR MISSION COVERAGE CONTINUES ON NTV

NASA Television will continue to provide live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission Wednesday. Atlantis launched from the Kennedy Space Center, FL, at 3:32 p.m. EDT June 27. Docking with the Mir occurred on Thursday, June 29 at 9 a.m. EDT. Undocking of Atlantis from the Mir is scheduled for 7:18 a.m. EDT July 4. Landing of the Orbiter at the Kennedy Space Center is scheduled for Friday, July 7 at approximately 10:56 a.m. EDT.

FRIDAY MISSION HIGHLIGHTS

(All times EDT)

- 2:32 a.m. CREW WAKE UP**
- 5:02 a.m. GIFT EXCHANGE**
The two crews exchange gifts
- 12:00 p.m. MISSION UPDATE**
Live review of the day's mission highlights from the Johnson Space Center, Houston
- 1:00 p.m. MISSION STATUS BRIEFING**
Live mission status briefing with NASA officials, from Houston, TX
- 2:35 p.m. VIDEO SURVEY OF MIR**
- 4:30 p.m. FLIGHT DAY VIDEO FILE**
A replay of the day's video highlights
- 6:32 p.m. CREW SLEEP BEGINS**

During the STS-71 mission, media may obtain mission updates by contacting the following NASA Newsrooms:

During mission, including Mir docking	Johnson Space Center, Houston	713/483-5111
Shuttle landing operations	Kennedy Space Center, FL	407/867-2468

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-

Launius, Roger

From: NASANews
To: press-release-nasa
Subject: NASA Announces 1995 STTR Phase I Selections
Date: Thursday, June 29, 1995 3:48PM

Jim Cast
Headquarters, Washington, DC June 29, 1995
(Phone: 202/358-1779)

RELEASE: 95-103

NASA ANNOUNCES 1995 STTR PHASE I SELECTIONS

NASA has selected 30 research proposals for immediate negotiation of Phase I contracts as part of the 1995 Small Business Technology Transfer Pilot Program (STTR).

"This program is one of the ways that NASA takes the knowledge gained in air and space exploration and transfers it to the public," said Jack Mansfield, Associate Administrator of the Office of Space Access & Technology, which is sponsoring the program.

The 1995 Phase I solicitation closed on March 23, 1995. Seventy-nine separate proposals were submitted by 67 small, high technology businesses from all sections of the United States. Research topics included: general aviation, advanced materials and structures for aerospace systems, energy conversion technology, access to space, and Mission to Planet Earth enhancements.

All proposals were peer reviewed for both technical merit and commercial potential. Four NASA field centers participated in these evaluations. Each of the 30 selected proposals will be awarded a fixed-price contract valued up to \$100,000 with 12 months to complete their Phase I projects.

The STTR program requires small business concerns to conduct cooperative research and development by partnering with a research institution. At least 40% of the work must be performed by the small business concern, and at least 30% must be performed by the research institute.

Companies that successfully complete Phase I activities are eligible to compete for Phase II awards the following year. The Phase II award process allows for two-year, fixed-price contracts of up to \$500,000.

- end -

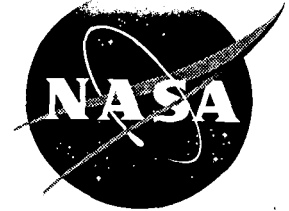
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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Jim Cast
Headquarters, Washington, DC
(Phone: 202/358-1779)

For Release
June 30, 1995

Keith Koehler
Wallops Flight Facility, VA
(Phone: 804/824-1579)

NOTE TO EDITORS: N95-44

METEOR MISSION MEDIA GUIDE AVAILABLE

The NASA Media Guide for covering the first flight of the METEOR spacecraft is now available. METEOR, which stands for Multiple Experiment Transporter to Earth Orbit and Return, will give scientists an unmanned platform on which to conduct experiments in space and return them to Earth. It is targeted for launch from the Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, VA, in early August.

METEOR, using the assets from the former program known as "COMET," will be lifted into orbit by a new space launch vehicle, the Conestoga 1620, designed and built by EER Systems of Vienna, VA. The mission, which includes seven NASA-sponsored and six commercial-sponsored experiments, will be the first commercial orbital launch from the Wallops Island and the first launch from EER's new commercial launch complex.

The media guide includes accreditation procedures, a description of available media services and facilities, maps and frequency approval documents for media operating radio-controlled cameras or uplink television systems.

Media must be registered for accreditation at least one week prior to the launch. Media requiring frequency approvals must file the documents with the Wallops Public Affairs Office by July 12, 1995.

To request the media guide, call the Wallops Public Affairs Office at 804/824-1579 or 824-1584 or Email your request to: Betty_Flowers@ccmail.gsfc.nasa.gov.

-end-

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600



Billie Deason
Johnson Space Center, Houston, TX
(Phone: 713/483-5111)

For Release

June 30, 1995

Lisa Malone
Kennedy Space Center, FL
(Phone: 407/867-2468)

NOTE TO EDITORS: 95-45

SHUTTLE AND MIR CREWS TO HOLD IN-FLIGHT PRESS CONFERENCE

A press conference will be held at 10:07 a.m. EDT, Monday, July 3, with the astronauts and cosmonauts orbiting in space aboard the Space Shuttle Atlantis and the Mir space station.

Participants will be the crew launched aboard Atlantis on June 27, which included the Mir-19 station crew, and the Mir-18 crew which has been on the Mir space station since March 16. The Mir-18 crew includes NASA astronaut Norm Thagard who now holds the record for most time spent in space by an American on a single space flight.

The crews will answer questions from news media at the Johnson Space Center, Houston, TX, the Kennedy Space Center, FL, and the Mission Control Center in Kaliningrad, Russia.

The event will be carried live on NASA Television which can be accessed through Spacenet 2, transponder 5, channel 9 located at 69 degrees West with horizontal polarization. Frequency is 3880.0 Mhz, audio 6.8 Mhz. Mission audio is available on Spacenet 2, transponder 7 with a frequency of 3971.3 Mhz, vertical polarization.

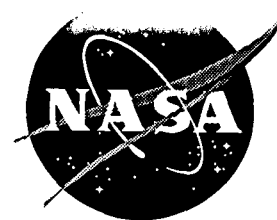
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Video Advisory

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Space Administration

Washington, DC 20546
(202) 358-1600



David E. Steitz
Headquarters, Washington, DC
(Phone: 202/358-1730)

For Release

June 30, 1995

VIDEO ADVISORY: V95-96

SHUTTLE-MIR MISSION COVERAGE CONTINUES ON NTV

NASA Television will continue to provide live coverage of the STS-71 Space Shuttle Atlantis-Mir docking mission over the July 4 holiday weekend. Atlantis launched from the Kennedy Space Center, FL, at 3:32 p.m. EDT June 27. Docking with the Mir occurred on Thursday, June 29 at 9 a.m. EDT. **Undocking of Atlantis from the Mir is scheduled for 7:18 a.m. EDT July 4.** Landing of the Orbiter at the Kennedy Space Center is scheduled for Friday, July 7 at approximately 10:56 a.m. EDT.

(All times EDT)

UPCOMING MISSION HIGHLIGHTS

SATURDAY

12:00 p.m. MISSION UPDATE
2:30 p.m. MISSION STATUS BRIEFING
4:00 p.m. FLIGHT DAY VIDEO FILE

SUNDAY

9:47 a.m. VIDEO TAPE FEED OF MIR TOUR
10:02 a.m. VIDEO TAPE FEED OF SHUTTLE TOUR
12:00 p.m. MISSION UPDATE
1:00 p.m. MISSION STATUS BRIEFING
4:00 p.m. FLIGHT DAY VIDEO FILE

MONDAY

10:07 a.m. JOINT U.S.-RUSSIAN CREW NEWS CONFERENCE
12:00 p.m. MISSION UPDATE
1:32 p.m. FAREWELL CEREMONY
2:30 p.m. MISSION STATUS BRIEFING
4:00 p.m. FLIGHT DAY VIDEO

TUESDAY

7:18 a.m. ATLANTIS UNDOCKING FROM MIR (may not be televised live)
12:00 p.m. MISSION UPDATE
2:30 p.m. MISSION STATUS BRIEFING
4:00 p.m. FLIGHT DAY VIDEO FILE

During the mission, media may obtain updates by contacting the following NASA Newsrooms:

**During mission, including Mir docking
Shuttle landing operations**

**Johnson Space Center, Houston
Kennedy Space Center, FL**

**713/483-5111
407/867-2468**

NASA Television is broadcast on Spacenet 2, transponder 5, channel 9, C-Band, located at 69 degrees West longitude, with horizontal polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

-end-